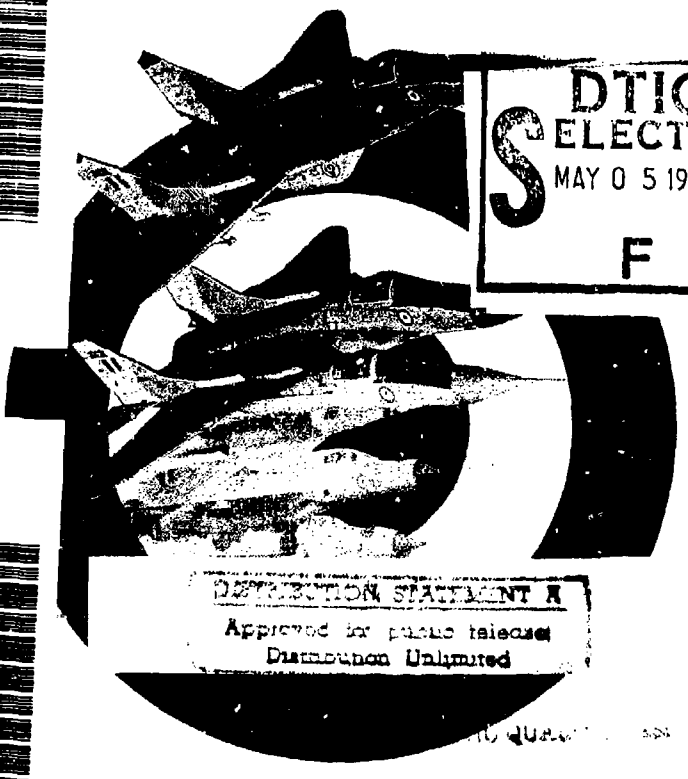
# THE Indian AIR FORCE

## TRENDS AND PROSPECTS











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# THE INDIAN AIR FORCE

## TRENDS AND PROSPECTS

GEORGE K. TANHAM & MARCY AGMON

Prepared for the
United States Air Force

RAND

Project AIR FORCE

# PREFACE

In light of the recent Gulf War, in which air power played a more dominant, effective, and visible role than in the past, many nations may attempt to increase their own emphasis on air power. To better understand the potential prospects of such a shift in military strategy, Project AIR FORCE at RAND has launched a multiyear effort to address this issue. The analysis is divided into two main efforts. The first portion explores the probable future position of the United States in the global balance of air power. The second portion analyzes air forces in a range of important nations to see how those organizations think about the past, current, and future role of air power in support of their national security.

This report, written for the second element of this research effort, provides an assessment of the Indian Air Force (IAF), the second largest regional air force in Asia (next to China's).[1] The Indian government does not release information on the military and has produced no official histories or other relevant publications. Accordingly, this report employs a wide range of unclassified material, including interviews, to provide additional insights. The project was a collaborative effort. To the degree that attribution is possible, the division of labor was as follows: George Tanham, the senior author, conducted a series of interviews in India with retired IAF officers, civilian officials, journalists, and academics. Evaluations of the IAF's role in India's wars, IAF strategy, training, leadership, and prospects

[1]Although India became independent in August 1947, it became an independent republic in January 1950. The Royal Indian Air Force would thereafter be called the Indian Air Force. In this report, the acronym IAF is used throughout.

for the future were largely his. The history of IAF procurement, force-structure trends, and current economic constraints were the responsibility of Marcy Agmon. This report is clearly not the last word on the IAF, but the authors hope that publication will spur additional work on this important but poorly understood air force.

The research was sponsored by Major General Richard C. Bethurem, the Director of Plans, Headquarters, United States Air Force. The research was conducted in Project AIR FORCE's Strategy, Doctrine, and Force Structure Program.

## PROJECT AIR FORCE

Project AIR FORCE, a division of RAND, is the Air Force federally funded research and development center (FFRDC) for studies and analyses. It provides the Air Force with independent analyses of policy alternatives affecting the development, employment, combat readiness, and support of current and future aerospace forces. Research is being performed in three programs: Strategy, Doctrine, and Force Structure; Force Modernization and Employment; and Resource Management and System Acquisition.

Project AIR FORCE is operated under Contract F49620-91-C-0003 between the Air Force and RAND.

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# SUMMARY

To better understand the Indian Air Force's role and position in Indian defense policy requires an appreciation of India's national security strategy. India has two main strategic priorities. The first is its internal security and order. Today, the police and paramilitary forces have primary responsibility for internal security, but it has been necessary to call in the army on many occasions.

The Indian armed forces' primary role, however, is the defense of India from external threats. India aspires to regional dominance and has perceived Pakistan as a constant challenge, not only to India itself but also to its position in the region. India and Pakistan engaged in open conflict in 1947, 1965, and 1971, and tension continues to this day. Another land neighbor, China, is perceived as the major threat, although it does not receive the attention Pakistan does. China attacked and humiliated India in 1962 and continues to aid Pakistan. The ending of the Cold War has not appreciably changed Indian perceptions of these two potential threats.

To counter these threats and to support its aspirations as a regional and a world power, India has developed large armed forces. Currently, the Indians maintain an army of 1.2 million personnel equipped with more than 3000 tanks, a large air force of roughly 700 fighter aircraft, and a navy possessing two carriers and 26 surface combatants. India likely possesses the capability to build nuclear weapons; however, no official details on Indian nuclear policy are available.

Civilians dominate security policymaking and strategy in India. Because traditionally Indians do little formal strategic thinking at

least in the Western sense, the services must accordingly plan without clear guidance on national policy, objectives, and strategy. Among the services, the army is dominant. It receives about two-thirds of the defense budget, is considered the main force in the defense of India against outside attack, and plays an important role in internal security.

India maintains the second largest air force in Asia. To better understand Indian thinking about the role of air power in support of Indian national security requires an appreciation for the operational experience in war of the Indian Air Force (IAF) since Independence.

## OPERATIONAL EXPERIENCE

### The Indo-Pakistani War of 1947

Almost immediately after Independence, India and Pakistan clashed over the future of Kashmir. The IAF provided transport support and limited combat support. Continued tension with Pakistan led to a significant expansion of the air force in the 1950s with the procurement of aircraft from Britain and France.

### The Sino-Indian War of 1962

In 1962, the Chinese launched a surprise attack against India across various parts of the Himalayas and quickly humiliated India and the Indian Army. As a result, the Indian government undertook a large and rapid buildup of the army and the air force (which received approval, in principle, to increase to a 50-squadron air force, later restricted to 45). Although Indian policy emphasized indigenous aircraft production, practical concerns resulted in the procurement of aircraft from abroad. Because of India's perceived tilt toward the Soviet Union and self-proclaimed neutrality in the Cold War confrontation, relations with the West deteriorated. But India found a ready and willing supplier of modern aircraft in the Soviet Union. The military supply relationship with the Soviet Union became vital to the IAF after the 1962 Sino-Indian conflict.

## The Indo-Pakistani War of 1965

During the IAF buildup following the 1962 war, Pakistan launched a surprise attack on India in September 1965. India, including its air force, was not ready for such an attack. Eventually, the Pakistan offensive was stopped, and the war ceased in a couple of weeks (although peace was not reestablished until early 1966). In the conflict, the IAF lost more aircraft than the smaller Pakistan Air Force (PAF), and air-ground coordination appeared to be a problem. The IAF's leadership was determined that the air force would provide better support for the army in the next war.

Neither country won this war, but both expected another. After the 1965 war, the IAF continued to acquire modern combat aircraft and had perhaps 39 squadrons and 700 combat aircraft by 1971. It also improved tactics and techniques based on the lessons of the 1965 war. The PAF was unable to keep pace following a cutoff of U.S. military assistance in 1965. As a result, by 1971 the IAF was in much better shape in qualitative and quantitative terms than the PAF.

## The Indo-Pakistani War of 1971

India started the 1971 war as a result of the East Pakistan rebellion against West Pakistan's domination. Although the war officially began with Pakistan's air attacks on December 3 in the West, the Indian Army had quietly invaded East Pakistan in November. The IAF had at least a ten-to-one advantage over the PAF in the East and in a few days wiped out those elements of the PAF stationed in the region and established absolute air superiority. The IAF then concentrated on assisting the Indian Army and contributed significantly to quick success in the East.

Although the war in the West was primarily a holding action with limited objectives, the IAF claimed a measure of air superiority and provided support to the Indian Army. In both the East and the West, the Indian Air Force went to great lengths to meet all army requests, and in some cases complained that the army asked for air support when it could have done the job itself. The 1971 war was probably the high point for the IAF.

## Conflicts in Sri Lanka and the Maldives

In more recent years, the IAF participated in the operations of the "Indian Peacekeeping Force" in Sri Lanka, 1987–1990. It ferried troops to Sri Lanka and continued to provide logistics support for the Indian Army. Combat aircraft were not used, although IAF helicopters provided fire support for the army. In Operation Cactus in 1988, the IAF flew at least a battalion of paratroopers more than 1000 miles to the Maldives when rebels attempted to overthrow the government. In these operations, the IAF demonstrated its ability to project forces on short notice.

A few observations are made here about these Indian wars and operations.

- The army has been the primary force in fighting India's wars. It seldom included the air force in its thinking or plans, except in the 1971 war, when the army, early in planning and during the war, consulted closely with the other two services. In short, the IAF has not figured prominently in Indian thinking about defense.
- The air force did not take the initiative in pushing concepts of air power or an air plan for the defense of India. While it did not wish to appear as just a supporting service, it was largely forced into that role. The IAF did concentrate on gaining control of the air by conducting air defense with interceptor aircraft and air strikes against the enemy air bases. This after all was the important air force role, which it could conduct alone. Even here, however, its contribution was limited.
- Air-ground cooperation has remained a controversial subject.

## MISSIONS

Based on this operational experience, the five major missions emphasized by the IAF are summarized below:

- *The air defense of India.* This mission is the top priority of the IAF. In the air force leadership's eyes, this mission is critical not only from a national but also a political point of view. No enemy planes should be allowed to hit vital installations in India. A

separate issue and not quite as important a priority is air defense of the army, to keep enemy air from interfering with Indian Army operations.

- *Strike missions.* These contribute to the air defense mission through the destruction of enemy air targets, air bases, and installations. Also, such strikes can help reduce an enemy's warfighting capability by interdicting enemy lines of communication and destroying economic targets, power grids, and other vital installations.
- *Close support for the army.* In some discussions, this mission is given the number-two priority. It will likely depend on the army's needs, the air situation, and the availability of aircraft. The heavy IAF emphasis on this role illustrates the army's preeminence in Indian defense policy. The air force does envisage some support for the navy, particularly in defense of its ships and installations, although it does not see that this support is as important as that of the army.
- *Airlift.* This mission involves transporting supplies for the IAF and the army, airlifting troops, and delivering paratroopers.
- *Reconnaissance.* A small number of aircraft are devoted to this mission, notably modified Canberras and recently acquired MiG-25Rs. Strategic reconnaissance missions are controlled by the highest level of the civilian government, not the IAF.

In prosecuting its highest priority mission—air defense of the country—the IAF sees the air threat as composed of low-level air penetrating aircraft. Efforts to improve electronic means of detecting low-flying aircraft continue but require the allocation of significant resources. Consequently, the air force has long maintained a mobile observation force that mans the northern and western borders to detect incoming aircraft and reports sightings to higher headquarters. It also has an Air Defence Ground Environment System (ADGES) that is not fully modernized.

Fighters are the main weapons for air defense, although the IAF also fields a limited number of surface-to-air missiles (SAMs). Surprisingly, the Indian Army fields a larger number of SAMs than does the IAF, which may reflect the concerns of the ground force about the ability of the IAF to protect advancing elements in the field.

The IAF knows that it must be prepared to support the army and to a lesser extent the navy. Efforts to improve air-ground cooperation have continued since the 1971 war, when it seemed to work fairly well. Both army and air force officers today agree that there are joint procedures in writing for air-ground cooperation as well as parallel organizations in the two services for close support operations. Concerns remain in the army as to how serious the air force is about supporting it. Differences between the army and the air force on these matters are not unique to India.

Future mission emphasis and capabilities continue to be debated. Historically, the IAF has maintained roughly equal numbers of air defense and ground attack fighters. The procurement and modification practices of the air force suggest that it is increasing its emphasis on multirole aircraft. For example, while the IAF's two most modern aircraft, the Mirage 2000 and the MiG-29, were bought for air defense purposes, the former is considered an important and effective strike aircraft against deep targets. A multirole emphasis will increase the flexibility of the IAF in combat. The success of such a policy depends, however, on providing sufficient resources to rigorously train the aircrew in multiple roles and to equip their aircraft with appropriate (and increasingly expensive) avionics and munitions.

## PROCUREMENT

A number of factors have influenced the procurement policies and the structure of the air force. Civilians make all final decisions in the complex and lengthy procurement process. The IAF has a limited role or impact on the final selection and procurement decisions—these rest solely with civilian authorities.

In reviewing the IAF's procurement history, several trends stand out:

- *Multiplicity of aircraft types.* The IAF—both today and historically—has possessed a wide variety of aircraft. For example, from 1970 to 1974, the IAF had seven types of fighters. By the late 1980s, about 11 different fighters were in use in the IAF. By the early 1990s, there were nine—still a considerable number. This large number created inevitable management, maintenance, organizational structure, training, and budget problems—prob-

lems that complicate the IAF's abilities in defining a coherent modernization strategy for the future.

- *Diversification of supply.* However, the consistent historical objective of Indian policy has been to diversify the suppliers of combat aircraft to some degree to mitigate the effects of outside arms embargos and political pressures on India's independence. In the end, though, this policy has not proven very successful. Currently, about 80 percent of the Indian aircraft fleet is of Soviet origin (although most are built in India). And this policy has contributed to the fragmented nature of the IAF's past and present inventory.
- *Indigenous production.* Another key trend in the development of the IAF's force structure has been the consistent desire to emphasize indigenous production to support India's economic base and increase independence from outside suppliers. India's record in indigenously designed and manufactured combat aircraft has been poor. Coproduction arrangements, however, have fared better. About half the current IAF fleet of combat aircraft, including all MiG-27s, most MiG-21s, and many Jaguars, were built in India. Desires for indigenous production also increased the attractiveness of Soviet aircraft. The former Soviet Union agreed to license-built production on very favorable economic terms for a number of aircraft. Several senior air force officers told the authors that to a certain extent the IAF grew the way it did because of the Soviet offers, even when they were not precisely what the IAF needed.

## FUTURE FORCE STRUCTURE ALTERNATIVES

The IAF today faces a wide range of very serious problems as it lays its plans to move into the twenty-first century. With a total force of perhaps 1400 aircraft, including approximately 700 combat aircraft and more than 100,000 personnel, the IAF consumes nearly one-fourth of India's defense budget. Seven different types of combat aircraft from three countries cause a range of training and logistics problems. The budget crunch, the loss of the Soviet Union as a reliable supplier of inexpensive aircraft, and the failure to plan ahead or perhaps to convince the government of its need have led to immediate and overwhelming air force requirements. The IAF needs to re-

place about half its aging fighter fleet, is seriously short of spares, and has long needed an advanced jet trainer. It is short of pilots, and training of new ones is suffering from a lack of training aircraft, instructors, and flying time. Little attention has been paid to procuring modern electronics and such force multipliers as aerial refueling and airborne early warning aircraft. How all these needs can be met is by no means clear, and no specific plans to address them are available.

To maintain current force levels requires dealing with the aging MiG-21 fleet. The MiG-21 has formed the backbone of the IAF for many years and today composes about 40 percent of the current IAF fighter force. Many of the MiG-21s have served for 20 to 30 years, and maintaining current IAF force levels will require replacement of this critical fighter. Plans are already under consideration to upgrade a portion of the MiG-21bis force.[1]

Pessimism over future IAF resources has led some in India to advocate that the air force anticipate future force reductions and deliberately choose to reduce the size of the air force within the next few years. This reduction, it is argued, would free up funds for reducing maintenance and spares costs, cut out some bases and infrastructure, and reduce the overhead of the air force. The saved funds could be used to develop a smaller air force with more modern aircraft, with force multipliers and modern weapons. But while this option may seem good for the short term, India, with its aspirations for great power status, continues to desire to acquire a modern air force roughly at least the same size as the present force.

## PROSPECTS FOR THE FUTURE

The IAF is a large and professional force. But as reflected in its performance in internal budget battles and the wider political debate, it does not seem to have developed an air doctrine that articulates the importance of air power to the defense of India. Nor has the IAF developed and publicized a concept for the greater employment of air power in the defense of India, which would seem to be a prerequisite to gaining a larger voice in the allocation of resources. Overall, the

[1]Recent reports indicate that India and Russia have come to an agreement on updating the MiG-21bis.

army continues to dominate the consideration of Indian defense matters. The war in the Gulf has not appeared to improve the IAF's political position in the Indian security community in spite of the demonstration of the importance of air power in modern war. Nor has it appeared to have roused the air force leadership to develop and articulate the air force's role in the defense of India.

Why this state of affairs? Numerous Indian commentators claimed to the senior author that the IAF's lack of success can be traced to inconsistencies in the quality of the IAF's leadership. Some felt that some IAF leaders have exhibited too narrow a perspective and their "cockpit" or "pilot" mentality inhibited them from making the necessary plans and investments in key areas. Others felt that the reasons for this inconsistency could be blamed on the air force policy to follow strict seniority in promotions to the highest level, including Chief. This system has prevented the IAF from taking advantage of younger, talented officers. The *Report of the Comptroller and Auditor General of India* is highly critical of air force leadership in training and maintenance.[2]

Complaints about leadership in troubled times are no stranger to any organization. And the budget, the civilian bureaucracy, and the "tyranny of the past" have played powerful roles in contributing to the IAF's problems. But these factors do not explain why long-range planning seems to have been neglected or inadequate, why the need for an advanced jet trainer has become so desperate, why the IAF seems to have concentrated on the acquisition of aircraft and paid less attention to providing for modern electronics, force multipliers, and other less glamorous but vitally important needs of the air force, and why the air force has been so poorly represented in internal political struggles with its sister services. Former Chief of Air Staff LaFontain may have put his finger on the problem when he recently said:

> We could have done very much better if we had introduced advanced ground level warfare devices such as the instrument range

[2]*Report of the Comptroller and Auditor General of India for the Year Ended 31 March 1992, No. 9 of 1993*, Union Government, 1993.

> system. We did talk about the system, but then, as with everything, this was also given up.[3]

In spite of the current budget problems and political difficulties, India has not given up its desire for military forces that it feels are appropriate for its security and for a nation of its size and importance. However, some retired personnel think that the IAF may be obliged to cut its size for a few years. Increasingly, public concerns have surfaced over the present state of India's military forces and the government's ability and capability for developing defense policies and strategies. Some changes in the defense planning machinery are being discussed in public. Economic reforms seem to be improving the economy—and may make modest increases in defense spending possible. But without changes in IAF policy and visibility, the future is more likely to resemble the past.

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[3]Sanjeen Verma and A. Thothathari, "Special Report: Indian Air Force into a Tailspin," *Business India*, September 13–26, 1993, p. 92.

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## ACRONYMS

| | |
|---|---|
| ADGES | Air Defence Ground Environment System |
| AJT | Advanced jet trainer |
| AOCinC | Air-Officer-Commander in Chief |
| ASW | Anti-submarine warfare |
| AWACS | Airborne Warning and Control System |
| BJP | Bharatiya Janata Party |
| CAC | Central Air Command |
| CIS | Commonwealth of Independent States |
| DPSA | Deep Penetration Strike Aircraft |
| DRDO | Defence Research and Development Organization |
| ECM | Electronic countermeasure |
| *FBIS* | *Foreign Broadcast Information Service* |
| FBSU | Forward-based support unit |
| FTE | Flight Training Establishment |
| GDP | Gross domestic product |
| GNP | Gross national product |
| HAL | Hindustan Aeronautics Ltd. |
| IAF | Indian Air Force |
| IMF | International Monetary Fund |
| IPKF | India Peace Keeping Force |
| IRBM | Intermediate-range ballistic missile |
| ITPP | Interim Training Plan for Pilots |
| JAAOC | Joint Army Air Operation Center |
| JOC | Joint Operating Center |
| LCA | Light Combat Aircraft |
| LTTE | Liberation Tigers of Tamil Eelam |
| LTTP | Long-term training plan [for pilots] |
| MOD | Ministry of Defence |

| | |
|---|---|
| MR | Maintenance reserves |
| NSC | National Security Council |
| OCU | Operational conversion unit |
| PAF | Pakistan Air Force |
| PNE | Peaceful nuclear explosion |
| RAF | Royal Air Force |
| SAM | Surface-to-air missile |
| USMAG | United States Military Advisory Group |

Chapter One

# INTRODUCTION

This report provides an overview of the Indian Air Force (IAF). It first presents a short summary of Indian defense policy. It then reviews the birth of the independent IAF, analyzes its role in the series of conflicts that India has been engaged in since Independence, and discusses some of the doctrinal issues that these conflicts have illuminated. Then the evolution of the IAF's force structure is analyzed and the future prospects for Indian air power are reviewed. The current IAF command structure is summarized in the Appendix.

Chapter Two

# STRATEGY AND THREATS

The end of the Cold War erased the tensions between the two superpowers, the United States and the former Soviet Union, but it has not brought peace nor reduced many other tensions in many parts of the world. Indo-Pakistani relations remain tense, especially over Kashmir, as they have since Independence. Furthermore, India has been involved in conflicts with her neighbors several times since 1947, although these wars were not directly connected with the Cold War. India's perceptions of external threats, combined with its aspirations to become a major power on the world stage, have led it to continue to field significant military forces.

To better understand the role of the air force in Indian defense policy requires an appreciation of India's current strategy and threat perceptions. India has two main strategic priorities. The first is its internal security and order. Today, the police and paramilitary forces have primary responsibility for internal security, but it has been necessary to call in the army on many occasions (e.g., Punjab, Kashmir, and the northeast). Thus, the army is the one service involved most actively in this effort. The navy plays no role. The air force has been active at times, dropping supplies, ferrying troops, and evacuating the wounded. To date, however, these sorts of operations have not been a major factor in air force planning and thinking.

The primary role of the Indian Air Force is the defense of the country from external threat, India's second strategic priority. Indians have traditionally thought of threats as coming by land, especially from the northwest and Central Asia. Indians emphasize the geographical and cultural unity of the subcontinent and the indivisibility of its

defense in their own defense considerations. Accordingly, Indian defense thinking encompasses not only the defense of its national borders but a strategic defensive region that includes its smaller neighbors, especially Nepal and Bhutan but also Sri Lanka and the Maldives. India is concerned about the internal stability and policies of its neighbors. Because of this desire for regional security, Indian policy aims at keeping all foreign influences out of the region. The small neighbors, however, do not agree and emphasize their sovereign independence and their own identity.

Pakistan, the old northwest frontier of British days, has in Indian eyes broken the unity of the subcontinent with its insistence on being a separate nation and its constant challenge to India's position in the region.[1] Furthermore, Pakistan and India have fought over Kashmir since 1947. This issue led to wars in 1947 and 1965 and was a contributing factor in the 1971 conflict. The contest over Kashmir remains a source of almost constant tension between the two countries to this day.

Pakistan, in Indian eyes, has also committed the cardinal sin of bringing into the subcontinent outside nations—the United States and China—to balance Indian regional dominance. Through diplomacy, outside arms acquisitions, and a more activist foreign policy, Pakistan has kept India on the strategic defensive. This position has played a powerful role in shaping independent India's strategic posture and has tended to make India reactive and defensive.[2]

The Pakistan threat may seem to be essentially focused in land terms, particularly with its present manifestation in Pakistan's recent support to Punjabi and Kashmiri nationalists seeking independence from India. However, a more detailed analysis clearly indicates a deeply rooted concern with the strategic threat from the Pakistan Air Force (PAF), especially its small force of advanced F-16 fighter bombers. The concern is exacerbated even by the limited maritime surveillance and strike elements of the PAF armed with Harpoon

[1]In 1947, Pakistan was composed of West Pakistan (present-day Pakistan), and East Pakistan (present-day Bangladesh, created after the 1971 Indo-Pakistani War). Neither fits into India's strategic view of the region.

[2]For additional insights, see George Tanham, *Indian Strategic Thought: An Interpretive Essay*, Santa Monica, Calif: RAND, R-4207-USDP, 1992.

antiship missiles, which in conjunction with the naval threat jeopardize Indian control of its sea lines of communication to the Gulf (vital for access to oil supplies).

Indian relations with another land neighbor, China, have often been tense. In 1962, China attacked and humiliated India and has provided military assistance to Pakistan in subsequent years. The Sino-Pakistani relationship continues to upset India. The long northern India-China land border remains a somewhat contentious issue, and the threat cannot be ignored.[3] The developing Chinese navy could also pose a threat to India's position in the Indian Ocean, as recent Chinese activities on the Myanmar coast in the Bay of Bengal seem to suggest. Also, China's nuclear and missile capability is looming in the background. In the final analysis, however, the potential Chinese threat does not raise the hackles that the Pakistan threat does, although it could prove far more serious.

India in turn has developed large armed forces.[4] In the 1980s in particular, India greatly increased its military spending. Currently, the Indians maintain an army of 1.2 million personnel equipped with more than 3000 tanks, a large air force of roughly 700 fighters, and a navy with two carriers and 26 surface combatants. China's army, however, is more than twice that of India, and its air force is also larger. Pakistan, one-eighth of India's size, has an army of 500,000 and an air force of about 400 combat aircraft.

To build up its defense capabilities and counter China, India drew close to the Soviet Union and in 1971 signed a Friendship Treaty with that nation. Although that treaty had been under discussion for some time, the time of the signing, August 1971, reflected Indira Gandhi's desire to ensure that the Soviets countered any possible Chinese threat to India's actions to establish Bangladesh.[5] The Indo-

[3]Low-level discussions between the two have gone on for some time, and some progress seems to have been made.

[4]India, involved in four wars in the last 47 years, maintains the fourth largest military establishment in the world—not out of line for the world's second most populous nation with its long sea and land borders.

[5]The treaty was somewhat revised and renewed with Russia in 1992.

Soviet relationship became close, and, from the Indian perspective, was also useful vis-à-vis the United States.[6]

Threats from land have concerned India for at least 3000 or 4000 years and especially the recent rulers of unified India: the Moghuls, the British, and the government of independent India. The British relied on the Royal Navy to defend India from any sea threat, and New Delhi concentrated on the land defense of India—in fact, the Indian Army. Naval strategy was formulated in London while Delhi largely dominated land strategy, although London and Delhi did have their differences. The Royal Air Force (RAF) contributed to this mission as air power developed between the world wars, but the army and the defense of India have been basically synonymous. Tribals in the northwest were a constant irritant, serious at times, but Russia in the nineteenth century was the major threat (hence the "Great Game"), and China to a lesser extent. The British organized a large, mainly infantry, Indian army for internal security and to defend India from all external land threats. The British commanded and officered regular combat units and totally manned the technical combat branches (the artillery signals and engineers). The role of Indian officers was strictly limited.

Although independent India now also supports a large navy and air force, the army still continues to dominate Indian strategy and its defense apparatus. This point can hardly be overemphasized. While the three service chiefs are theoretically equal, the army chief, in fact, has more influence and power than the others. It has been the army that has primarily fought India's four wars and other overseas operations. The Indian Navy emphasizes the potential sea threats and the need to protect India's increasing maritime interests, but it is still the smallest of the three services in manpower and in resources. The air force, at least publicly, does not seem to have carved out or enunciated any significant role for itself, except perhaps in air defense.

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[6]However, a growing percentage of Indian thinkers and policymakers support closer relations with the United States in all areas, including the military, now that the United States is showing signs of approaching its relations in the region in a more balanced manner.

## STRATEGY

While Indians concerned with national security issues have developed strategies since Independence, they do little formal strategic thinking, at least in the Western sense. Furthermore, no government offices are formally dedicated to strategic thinking and planning. Strategies appear to just evolve in India, and much is done on an ad hoc basis.[7]

The periods of political unity in India have been limited, although for the past 500 years the Moghuls and the British more or less ruled most of India directly or indirectly, and now independent India rules itself as a united India. For much of its past, India was divided into small states, and since there was little concept of a political unit called India, there was no strategic thinking about India; each state worried about itself.[8] Furthermore, although the British over time evolved a strategy for the defense of India, it was not carefully or systematically thought out, but rather emerged. Major strategic decisions were made in London, although Delhi often had its own ideas. Since Indians did not participate in even this informal process, they did not develop a tradition of Western strategic thinking. Without their own tradition of strategic thought, India has had little formal strategic thinking.

Civilians in the Ministry of Defence, not the military services, make strategic decisions and defense policy. The services do their own operational planning; it is not clear just how much joint planning there is, although there is the Joint Planning Committee. This committee appears to coordinate the requirements of the three services, but does little if any strategic planning.[9] Although a National Security Council (NSC) has been on the books since 1990, little or nothing has been done about it. Discussions in May and June 1993 in the *Lok Sabha* (Parliament) and its more active Defence Committee suggest

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[7]This cultural inclination seems at odds with Fabian socialism and its emphasis on planning espoused by Nehru and other Indian leaders, although both philosophies have existed side by side for more than 45 years.

[8]The primary basis for the concept of an India is cultural, not political or military; hence, there is little scope for strategic thinking about India as a whole.

[9]Meeting with senior members of the committee in New Delhi, February 1993.

renewed interest in defense planning and in an NSC.[10] Words, however, cannot substitute for deeds. Currently, the Indian government has limited apparatus for national security planning and is only moving slowly toward it.

Since the services have suffered from a lack of policy guidance, clear national objectives, and agreed-upon strategy, it is hard for them to plan. High-level matters have been largely in the hands of the Ministry of Defence civilians, with only some inputs from the chiefs of the services when asked. Furthermore, given India's strict rules on secrecy, there is little informed public discussion of military and security matters, and the services cannot take their case to the public.[11] The government has never put out a white paper on strategy or defense policy, and no government records on defense have been made available to the public since Independence. While discussion of defense matters has increased in the *Lok Sabha* and in public, the government retains a firm hand on all defense matters.

Civilians dominate decisionmaking in the Defence Ministry. They decide matters of defense policy and strategy, make the final decisions on service procurement, and decide on all matters of major interest pertaining to the services. The Ministry of Finance often makes the final decision on matters with financial implications, and that means on most important matters. The chiefs can only request; they have no decisionmaking authority except in the narrow military operations of their services. The services resent that they are under the thumb of bureaucrats who are rotated frequently and often have little knowledge of military affairs. However, the services are very scrupulous in their adherence to civilian political controls as opposed to bureaucratic domination.

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[10]The 19th Estimates Committee Report, 1992–1993, has pointed out this lack of planning and the need for it. [Unpublished reports.]

[11]In the 1970s, expert committees set up by the Indian government drew up *Perspective Plans* for the services that look 25 years ahead to the year 2000. They may include strategic matters, but almost no information on them is available and they seem infrequent. See General K. V. Krishna Rao, *Prepare or Perish: A Study of National Security*, New Delhi: Lancer Publishers, 1991, pp. 399–401.

## NUCLEAR WEAPONS

No discussion of Indian military potential would be complete without mention of India's nuclear weapons potential. The United States and others are very concerned about nuclear weapons in both India and Pakistan. India demonstrated its capability as early as 1974, when it exploded a nuclear device.[12] Although it is generally conceded that this device would not have been a deliverable weapon, there is little doubt that India's nuclear capability has continued to progress since that time. Certainly, India's indigenous nuclear power reactors have produced sufficient fissile material to give it the potential of producing a number of nuclear weapons. It seems likely that both India and Pakistan possess the capability to make a number of nuclear weapons.

Indians debate whether India should have such weapons. Many in India oppose nuclear weapons on moral and other grounds, but others argue that India should have them. The Hindu Bharatiya Janata Party (BJP) has stated that if it were to gain a majority in the Parliament and elect a Prime Minister, it would favor an open declaration that India has a nuclear capability and is prepared to field that capability should its security interests demand. The BJP cites the fact that China is a nuclear power with no intention of giving up its nuclear capability and that India for its own protection should emulate China. India would very likely field a nuclear capability if it became convinced that Pakistan would do so or had done so.

Many Indians strongly believe that to reach its proper position as one of the important world powers, India must preserve a nuclear option. A few strategic thinkers such as former Indian Army Chief General K. Sundarji and K. Subramanyam, former director of India's Institute for Defence Studies and Analysis, have discussed some aspects of deterrence, some of its psychological implications, and even possible uses of nuclear weapons.[13] But there has been little open discussion on how, when, where, etc., to use nuclear weapons, or what the targets and objectives of their potential use might be. Similarly, there

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[12]Indians refer to it as a "peaceful nuclear explosion" (PNE).

[13]For one of the few recent books on the subject, see General K. Sundarji's *Blind Men of Hindoostan*, New Delhi: UBSPD Publication, 1993.

has been almost no discussion of safety concerns surrounding nuclear weapons. Also, no evidence exists that Indians have considered positive control or such safety features as permissive action links, which would prevent unauthorized detonations and misuse. Some individuals such as General Sundarji appreciate the necessity of thinking through some of these issues. The Indian defense establishment at large appears to have an almost blind faith that when the time to field nuclear weapons is right, all the necessary control and doctrine will somehow appear. The military claim they have no knowledge about nuclear matters and so cannot plan for the use of nuclear weapons.

If the time ever comes, presumably one of the services, most likely the IAF, in the immediate future will be given the responsibility for the delivery of nuclear weapons.[14] There is no indication that the IAF has any desire to be given this capability. In fact, no service appears eager for India to acquire nuclear weapons. The services seem to prefer the weapons they have and are familiar with. They also believe that an Indian decision to go nuclear will certainly force Pakistan to acquire a matching capability. Given the volatility of the Indo-Pakistani relationship, the Indian military would greatly prefer to maintain the status quo, particularly because nuclear weapons might make Pakistan feel more the equal of India.

If Indian strategic thinkers consider nuclear weapons as a potential equalizer vis-à-vis China's superior military potential, Pakistan has similar aims in preserving its nuclear option vis-à-vis India. But weapons capability is only half the story. Both countries also seek to acquire modern delivery systems that ensure a viable means of weapon delivery. Currently both countries have modern aircraft that have a potential nuclear delivery capability, such as Pakistan's F-16s and India's Mirage 2000 and Jaguar aircraft. In addition, both countries are seeking ballistic missile delivery systems.

India is well on the way to developing an advanced missile delivery capability. Its short-range ballistic missile, the Prithvi, is being deployed, while the intermediate-range Agni is in advanced stages of development. The Prithvi is ideally suited to a potential conflict with

[14]There are reports that IAF Mirage and Jaguar aircraft have practiced simulated nuclear weapon drops.

Pakistan, while the longer-range Agni could reach Beijing if launched from extreme eastern India. Pakistan's indigenous missile programs are not as advanced as India's, and their HATF 1 and 2 apparently are not as sophisticated as India's missiles. However, Pakistan appears to have obtained some missiles from China, and future cooperation between the two allies may lead to an increased Pakistani missile capability.

The Indians maintain tight secrecy regarding nuclear weapons, they send ambiguous signals, and in some cases may not be entirely sure themselves about future developments. A small group of civilians may be working on this problem; however, it would not be surprising, given India's propensity not to plan ahead, that much of this is being put off for the future. Not much more can be said at this point given the limited information available on this subject.

Chapter Three

# THE ORIGINS OF THE INDIAN AIR FORCE

The British government did not permit Indians to play a role in military aviation in India until the pressures of Indian leaders demanded greater participation of Indians in the army and forced the British to begin considering the air force issue. After World War I the Chief of Staff, Lieutenant General Sir Andrew Skeene, chaired a committee formed to study a proposal to increase "Indianization" of the army in India.[1] In 1925, the committee ruled that more Indians be permitted to serve as commanding officers of British troops. It also recommended the establishment of an air element in the Indian military forces. The committee recommended that a few selected Indians be sent for training to the Royal Air Force Training College at Cranwell in England and then be commissioned in an air arm of the Indian Army. Air Vice Marshal John M. Salmond, then the Air Officer Commanding in India, advocated instead an independent status for the air force equal to that of the army. Opposition to his proposal was strong and widespread, but the idea was eventually accepted.

After the principle of an independent air force was accepted, the Indian government introduced the Indian Air Force Bill in the Legislative Assembly, where it was viewed with some suspicion as a British "instrument of repression." These fears were gradually allayed, and the bill was passed in April 1932. Subsequently, the Indian Air Force Act came into force on October 8, 1932, which is now celebrated as Air Force Day. Although the idea was accepted in theory by

[1]Very modest Indianization of the army had begun in 1918, when a few Indians were given the chance of King's Commissions, which allowed Indians to command British troops, not just Indian soldiers.

the government of India, the new IAF, like the Indian Navy, functioned in practice under the authority and supervision of the Commander in Chief of India, always an army general. This policy remained until after Independence, when all the chiefs were, at least theoretically, equal.

The first partial squadron of the IAF was formed in April 1933 with a flight of four primitive Wapiti biplanes (jokingly referred to as "what a pitys"). The "A" flight team then trained for the next four-and-one-half years, mainly in "Army cooperation," having completed a course at the Army Cooperation School in England. The unit saw some service along with RAF units in the northwest to help the army control unruly tribesmen. A few more aircraft were added before World War II, but in 1939 the Indian Air Force numbered only 16 officers and 144 men. There was only one incomplete squadron, but the command of that squadron, No. 1, had passed from an RAF officer to an Indian IAF officer. This first Indian officer, Subroto Mukherjee, was later to become the first Indian Chief of Air Staff in 1954.

World War II drew British attention and resources away from India. India was left essentially unprotected until additional forces were reinserted in 1943 following the 1942 British defeat in Burma. Fears continued of a Japanese invasion, which materialized but was stopped at Kohima. The IAF continued to grow slowly. By 1942 the IAF had grown to four squadrons, and it was decided that it should be expanded to ten squadrons. While the target date was December 1943, it was met by February 1944. At that time, the IAF squadrons were 40 percent short of Indian pilots; the shortfall was made up by British pilots.

The original IAF No. 1 Squadron as well as a few of the newer ones took part in the unsuccessful campaign against the Japanese offensive in Burma in 1942. Eventually, all the squadrons took part in the Allied counteroffensive of early 1944, flying Vengeances for bombing and Spitfires and Hurricanes for support of the ground forces. The IAF squadrons also flew reconnaissance missions and dropped small supplies to the troops. Flying low-level sorties for visual and photo reconnaissance and airdrops proved dangerous, and a number of aircraft were lost. The Allied campaign was successful, Rangoon was recaptured in May 1945, and the war ended a few months later. All in

all, the small IAF flew about 16,000 sorties in Burma during the war—all generally in support of the army.

When British India was partitioned into India and Pakistan in 1947, the British forces in-country were divided into two portions. The IAF comprised eight fighter and two transport squadrons. The Indians received six fighter and one transport squadrons, while Pakistan received three squadrons, two fighter and one transport. Other air assets located in the new nations went to the respective countries. Both air forces also took over some of the RAF aircraft and assets as Britain withdrew.

When India achieved independence in August 1947, a British officer, Air Marshal Sir Thomas Elmhirst, was appointed as the IAF's first Chief of Staff.[2] His acceptance was conditional as he wanted assurances from Prime Minister Nehru that the air force would be a fully independent service. Until that time, the commander in chief of the Indian Army had exercised control of both the army and the Indian Air Force. He also asked for the technical assistance of several RAF officers of his choice for the first year. The Prime Minister agreed to both conditions.

After partition, the early Indian Air Force planners decided on the concept of a balanced force. The IAF would acquire and maintain both a shield and a sword, a fighter force primarily for the air defense of the country and a strike force for offensive operations. In addition to air defense and offensive operations, the IAF prepared to provide support to the army and the navy, both with combat air support and transport assistance. In the early 1950s, with these roles in mind, a plan was submitted to the Defence Committee of the Cabinet by the air force planners through air force and Ministry of Defence channels. It proposed a minimum of a 20-squadron force with the necessary supporting units. Financial considerations led the Cabinet to approve only a 10-squadron force; however, it approved training and other facilities to serve a 20-squadron force. The modern IAF was under way.

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[2]Air Marshal S. Mukherjee was the first Indian Chief, taking over in April 1954 after the first three Chiefs who were British officers.

Chapter Four

# INDIA AND ITS WARS—THE DEVELOPMENT AND ROLE OF THE AIR FORCE

India has fought four wars since its independence in 1947: three with Pakistan and one with China. It has also engaged in two overseas operations: a fairly protracted one in Sri Lanka (1987–1990) and a brief intervention in the Maldives in November 1988. This chapter provides a short overview of important force structure developments and the IAF's experiences in these conflicts.

## INDO-PAKISTANI WAR OF 1947

The partition of British India in 1947 into a Muslim state, Pakistan, and a secular although Hindu-dominated state, India, was an unsuccessful and very costly attempt to resolve the Hindu-Muslim communal problem (Figure 4.1). The migration of Hindus to India and Muslims to Pakistan led to millions of deaths, tremendous suffering, and lingering hatreds without resolving the basic issues that divided the two nations.

The agreement that led to partition of the subcontinent in 1947, among other provisions, stipulated that each princely state could choose between acceding to India or Pakistan. The presumption was that states with majority Muslim populations would join Pakistan, while the rest would join India. A simple formula became complicated by the fact that Kashmir, although mostly Muslim, was ruled by a Hindu Maharajah. He vacillated, first leaning to one side and then the other while also considering independence from both India and Pakistan. His hand was forced by rebellious tribesmen in Kashmir and by a Pashtun tribal invasion force supported by Pakistan that

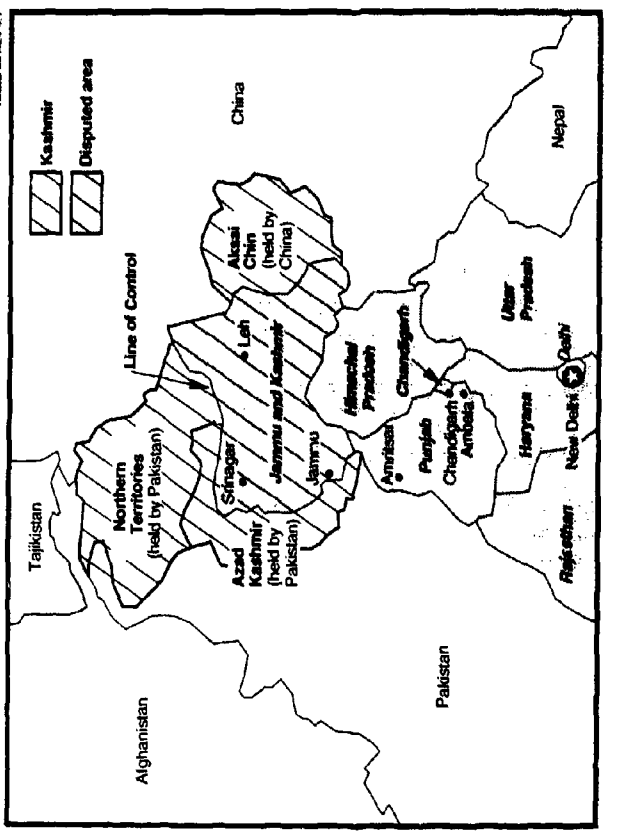


Figure 4.1—Kashmir—The Scene of Conflict

threatened to take Kashmir by force. He sought assistance from India to preserve his rule, but India insisted on his adherence to India before it would provide military support. Therefore, the Maharajah signed the Instrument of Accession on October 26, making Kashmir a part of India. Pakistan refused to recognize the legality of the agreement and continued to fight.

Beginning on October 27, the Indian Air Force started ferrying Indian troops to protect Kashmir's capital, Srinagar, and in five days the 161st Brigade was totally in place. This action was a critical event of the war as it enabled the Indians to successfully defend Srinagar, and eventually to retain much of Kashmir, with the rest being under Pakistan's control to this day.

During the rest of the war, which lasted until December 31, 1948, the air force continued to ferry troops and drop supplies. It constructed an air base at Leh, one of the highest in the world at over 10,000 feet, to support the war effort; the air base is still important for the IAF. It also provided close support for the army, even to the extent of dropping bombs out of DC-3s. The main fighters were Spitfires and Tempests. The very limited range of the former necessitated their operating out of Srinagar, which was far from supplies and dangerously located. The Tempests could operate from the safer bases of Ambala and Amritsar. The new, small IAF did its best to support the army with its limited combat aircraft, but this effort was of modest assistance. The first war clearly demonstrated the valuable transport contribution the air force could make to the army, but it was largely a ground war with the army playing by far the dominant role.

The war lasted for more than 1 year and ended inconclusively when United Nations mediation finally ended the fighting on January 1, 1949. The war did not resolve the fundamental issues of conflict. On the contrary, it cemented the ill will that characterizes Indo-Pakistani relations to this day. One more war and many major and minor crises have not changed the situation, which is very tense in 1994.

## SINO-INDIAN WAR OF 1962

### Prewar Procurement

Before partition and Independence in 1947, the Indian military was dominated by and dependent on the British. After Independence, tensions between India and Pakistan complicated British relations with both parts of its former colony. British efforts at neutrality constrained both Pakistan's and India's abilities to acquire arms, causing the IAF to search for alternative sources of aircraft.

However, financial constraints led to the IAF's falling back on the British time and again for whatever could be spared. Most IAF squadrons continued to fly the same types of aircraft that had been acquired during the war: Hurricanes, Spitfires, and Tempests. To develop its nascent bomber force, the IAF made several Liberators abandoned by the U.S. Air Force after World War II serviceable.[1] But soon the jet age dawned. In the 1950s, the IAF acquired the British Vampire jet fighter in very limited quantities, because of both limited availability of the aircraft and India's budget.[2] During a period of tension between India and Pakistan in 1951, the British employed a "go-slow" tactic aimed at delaying the supply of Goblin engines for the Vampire force. This tactic drove home to the Indians the need to diversify their sources of supply, although this policy, as will be seen, would add to the difficulties and costs associated with maintenance of IAF aircraft.

By the end of 1952, the Indian government approved a 50 percent expansion of the IAF to 15 squadrons. In the face of Pakistani modernization, the IAF argued strenuously for modernization using U.S. and British aircraft. The United States, however, attached political strings to its arms sales to India, and the IAF encountered difficulties in procuring Venom fighters from the United Kingdom. To diversify, procurement of French aircraft was pursued. The French Ouragan, renamed the Toofani in IAF service, was purchased beginning in

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[1]Air Marshal M. S. Chaturvedi, *History of the Indian Air Force*, New Delhi: Vikas Publishing House Pvt. Ltd., 1978, p. 107.

[2]"India's Air Power," *World Airpower Journal*, London: Aerospace Publishing Ltd., 1993, p. 140. Eventually, however, it would procure more than 400 Vampires, including night fighters.

1953.[3] Some 100 Ouragans were procured and remained in service until the mid-1960s.

The increased modernization of the Pakistan Air Force, with U.S. help, in the mid-1950s spurred the Indians to continue a very ambitious force modernization and expansion program that would eventually double the size of the IAF's combat force within ten years.[4] To accomplish this program, India employed a wider range of procurement strategies: license-building some parts of aircraft, procuring others off the shelf, and also attempting to develop indigenously designed and manufactured aircraft. If success could be achieved in the latter, India would no longer be dependent on unreliable external sources of aircraft and equipment. Achieving this success would be a large step toward the national goal of self-reliance.

In 1956, the Indian government concluded an agreement with the Folland Aircraft Company of Britain for the licensed production of the lightweight Gnat air defense fighter in India. In addition, a license agreement was concluded with Bristol Aero-Engine, Ltd., for the production of the Orpheus Engine in India. According to Pushpindar Singh, a respected civilian analyst of the evolution of the IAF, India's selection of the Gnat had more to do with its production ease than with an interest in a lightweight fighter concept, although the Gnat's performance proved highly successful in the 1965 and 1971 wars.[5] As part of India's attempt to free itself from dependence on external suppliers, that same year the government decided to design and develop its own supersonic fighter. Dr. Kurt Tank and other German engineers were hired to design and develop the HF-24 Marut, which would eventually enter service in limited numbers in the 1960s (although its performance proved to be highly disappointing, because the requisite engine was not or could not be obtained).

For the top end of the IAF, however, foreign-built aircraft were needed. French Mystère IVAs were ordered in 1956, and 110 were delivered by 1958. For some years, they were primarily used for air

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[3]According to Pushpindar Singh, *Aircraft of the Indian Air Force, 1933–1973*, New Delhi: English Book Store, 1974, p. 15.

[4]The Pakistanis argued that the IAF's acquisition of jets forced them to obtain jets.

[5]Air Chief Marshal P. C. Lal, *My Years with the IAF*, New Delhi: Lancer International, 1986, p. 80.

defense, with a secondary fighter-bomber role. While highly successful for ground attacks largely because of its relatively large payload, the Mystère's poor handling characteristics and maneuverability limited its capabilities as an air-to-air fighter. At the same time, the IAF ordered British Canberra medium bombers; eventually, 117 were acquired. During subsequent years, Canberras were used for a wide variety of roles, such as attack operations, reconnaissance, ECM support, and antishipping. To complete this ambitious modernization program, in 1957 the IAF concluded an order for the highly capable British Hawker Hunter fighter. Eventually, 200 Hunters were procured in the 1950s and 1960s. The Hunter served primarily as a ground attack fighter, but it was also assigned the air defense role in North India.

## The War

As the IAF struggled to expand and integrate this wide range of new aircraft (four different fighters and one new bomber), the nation was suddenly embroiled in conflict with its powerful northern neighbor China in 1962—a conflict for which India was ill-prepared.[6] The Chinese had taken over Tibet in 1950 and had begun to develop road systems along the border, particularly through the Aksai Chin area to connect Singkiang and Tibet. Although a few Indians became aware of the Chinese threat, Prime Minister Nehru and the Parliament did not seem to take it seriously. Border activity and disputes increased during the late 1950s, and troop confrontations developed in some areas. India adopted a "forward policy" of pushing its troops toward the boundaries that it claimed, but did not seriously prepare for war. Nehru, although having increasing concerns about Chinese intrusions into what he considered Indian territory, clung to the view that India and China were and would be friends. The Chinese attack in the fall of 1962 shocked and surprised most Indians. The Indian Army was caught largely unprepared and suffered a humiliating defeat,[7] partially by the failure of its political leaders.

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[6]In December 1961, India had used army troops, with some IAF support, to easily drive the Portuguese out of Goa. This quick victory gave Indians a false sense of their army's capabilities. Thus, the debacle in 1962 came as a great shock.

[7]Although various army leaders had warned of Chinese intentions, the army was almost totally unprepared for the cold, high-altitude conflict.

The air force knew nothing about the army plans and was not consulted in any way about defense against a Chinese attack—not surprising as the army did not have any specific plans.[8] The Minister of Defence, Krishna Menon, tried to run the Ministry single-handedly and did not allow any planning against China because he did not believe it would attack India. Once the attack began, Nehru decided that the combat air force would not be used against the Chinese, probably because he feared Chinese reprisals against Indian cities.[9] As in 1947–1948, the air force provided all the airlift it could, ferrying troops and supplies. This support in no way, however, made up for the deficiencies in army supplies and deployments and the overwhelming strength of the Chinese. For the second time the IAF's airlift role was the important one.[10] The Indian government, although in a desperate state and calling for massive American air support, did not investigate what its air power might do to redress the situation.[11] In the end, the government based all its hopes on the traditional defense service—the army. The end result was a humiliating defeat—and the need to allocate far more resources for defense to deal not only with Pakistan but with China as well.

## INDO-PAKISTANI WAR OF 1965

### Prewar Procurement

Following the war with China, India embarked on a major military expansion program, some of which had been decided on even before that conflict. The government decided to expand the IAF greatly, a plan that required the procurement of a substantial number of new

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[8]See Steven A. Hoffman, *India and the China Crisis*, Berkeley, Calif.: University of California Press, 1990, p. 134: the "vacuum in military planning at higher levels encouraged ad hoc thinking and action."

[9]The U.S. Ambassador, Kenneth Galbraith, reportedly urged Nehru not to use the air force.

[10]Air Marshal G. V. Gole, in "The Air War That Never Was," *Vayu Aerospace Review*, 1/1993, pp. 36–43, has written an interesting essay on how use of the IAF might have favorably changed the war's outcome.

[11]Indian Air Force leaders believed and informed government officials that because of the altitude the Chinese air force would have to take off from Tibet with reduced weapon loads and hence would not be a significant threat to Indian cities; this opinion, however, was rejected. They also offered suggestions for using the IAF, but these too were dismissed.

fighters beyond those ordered during 1956–1957. Krishna Menon, India's Defence Minister, was particularly interested in acquiring aircraft that could be manufactured domestically to reduce India's dependence on external sources, but strongly favored Soviet aircraft if foreign procurement became necessary. The IAF did not share this view and believed that Western aircraft were superior. After evaluating various aircraft, the IAF concluded that the delta-winged Mirage III best satisfied the operational requirements of the proposed fighter and fighter-bomber squadrons. However, the French were not willing to permit the licensed manufacture of the Mirage in India. This problem, combined with the high cost of the Mirages, put paid to this plan. An initial U.S. offer of F-5As was withdrawn just before the 1965 war began. Accordingly, the IAF chose to procure Soviet aircraft.

The Indians negotiated an agreement with the Soviet Union to purchase 12 MiG-21s and to set up production facilities in India. By August 1965, 12 MIG-21s had been delivered, but they were too new and unfamiliar to the Indians to be used in the war.[12] The early MiG-21F and -FL models offered by the Soviets did not fully satisfy IAF operational requirements, as they were particularly deficient in the ground attack role (with both range and payload problems).[13] Other problems were also encountered. For example, the early-model MiG-21s did not have air conditioning (which the Soviet climate did not require), and one pilot said he lost seven pounds in a 20-minute practice low-level mission.[14] These deficiencies were outweighed, however, by the Soviets' willingness to arrange for licensed manufacture of the MiG-21 in India. Moreover, the issue of spiraling costs of new aircraft acquisitions was eased by the relaxed terms offered by the Soviets.

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[12]Air Chief Marshal L. K. Mehra, former Chief of Staff, maintains that six MiG-21s were delivered in the spring of 1963 and six more in August 1965.

[13]A subsequent variant, the MiG-21M, was later acquired for ground attack and began to enter service in about 1973.

[14]Senior author's interview with Jasjit Singh, New Delhi, January 1993.

## The War

In 1965, India was recovering from the shock of the Chinese-inflicted humiliation of 1962 and was increasing the size and quality of both its army and its air force. It was not yet prepared for another war. Still afraid of China, many of India's best army units and many air force units were stationed to meet a Chinese threat. Pakistan, on the other hand, strengthened by American military aid and by Chinese support, seemed to believe that 1965 presented a good opportunity to make another try for Kashmir, as India would only get stronger as time went on. Thus, early in the year, Pakistan infiltrated forces into the Rann of Kutch, presumably to test the Indian government's will and its army's capabilities and will.[15] Pakistan apparently felt encouraged by its efforts and the lack of a strong Indian reaction. Prime Minister Lal Bahadur Shastri, however, warned that the next time India would respond at a time and place of its own choosing; Pakistan ignored this warning.

The Indian government did not seem unduly concerned in spite of these Pakistani military activities in the Rann of Kutch. In the face of intelligence reports and increasing Pakistani infiltration and support for irregular forces in early August in Kashmir, India remained complacent. However, the Indian Army was scattered along the Pakistani border in "penny packets," and the Western Army commander became increasingly worried about his tactical dispositions. The scene of conflict is shown in Figure 4.2. A meeting on August 2, attended by top army officers and the Federal Home Secretary as well as Home Ministry officials of the state of Kashmir, is quite revealing. No Ministry of Defence officials and no air force officers were included. Among other things, the attendees agreed to reorganize the army forces along the border, to raise additional home guards, and to try to raise the morale of the border population. The meeting did not reflect any serious anxieties over Pakistan's intentions. On August 31, the Indian Army Chief of Staff visited the front and said it was difficult to assess the meaning of Pakistan's military dispositions; in any case, he was not worried about a Pakistani offensive.

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[15]The Pakistanis claimed much of the Rann and felt that India was illegally occupying it.

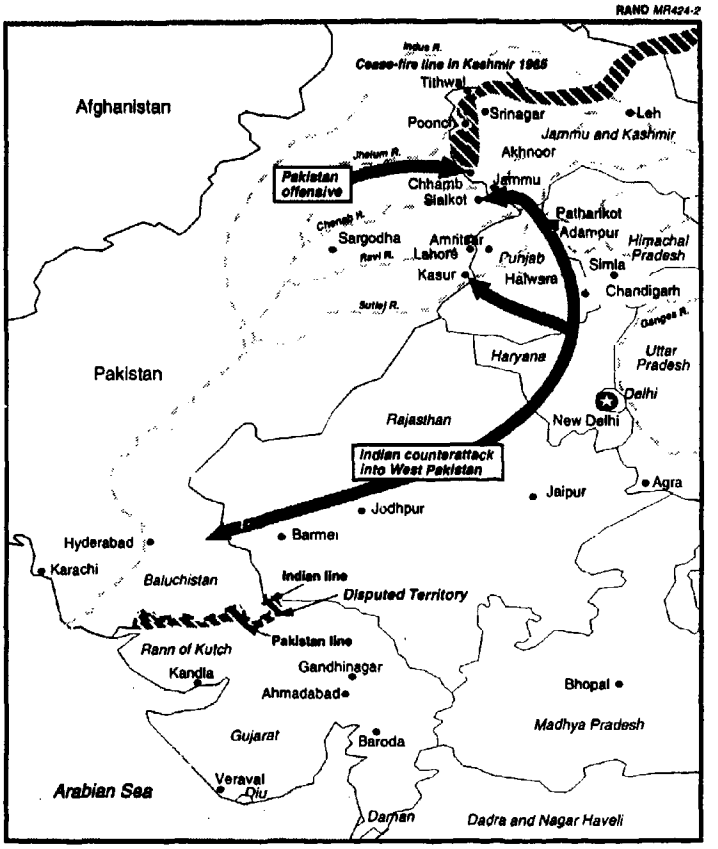


**Figure 4.2—Indo-Pakistani War of 1965**

Apparently, the air force was generally informed about these events; however, the views of the Western Army commander and Delhi seem to diverge over Pakistani intentions. In any case, the air force was not asked what its position would be if a Pakistani attack occurred, and no joint contingency plans were made. Air Marshal Lal felt that

the Army Chief of Staff looked down on the air force as a young and inexperienced organization that probably could not offer much help to the army.

The 1965 war was the first in which the IAF was fully engaged. IAF officers were eager to repair the damage done to all the military by the Chinese defeat in 1962. But they were hampered by a variety of factors. As a result of the defeat at the hands of China, the IAF was in the midst of a very rapid and large buildup in all aspects. Experienced personnel had been taken from all squadrons to form new ones. New people, new aircraft, and new equipment were being introduced into the air force very rapidly. A wide variety (at least six different kinds from four nations) of fighter aircraft existed, and old aircraft were retained in an effort to build up quantitatively. This buildup meant that the air force leadership was concentrating on growth rather than on fighting a war.

The Pakistan Air Force (PAF), on the other hand, had been receiving modern American equipment for a number of years. Most of their aircraft had been in their inventory for seven to ten years and involved only three kinds of American aircraft: F-86, F-104, and B-57. The United States had also supplied some air-to-air missiles and an air defense system. The PAF, well trained by the USAF, was small, tight-knit, and ready to go.

The IAF had approximately 800 aircraft at the outbreak of the war. Approximately 250 were transports, but the remaining 550 of the fleet were combat aircraft. These were organized into 24 fighter squadrons and 3 Canberra squadrons. Some of the fighters, such as the Vampires, Ouragons, and Gnats, were rather old, but some were fairly modern, such as the Hunters and MiG-21s (although the latter were just coming into service and were not used in the war). Fourteen of the fighter squadrons were available for the war in the west. The remaining nine or ten squadrons were held in the east for a possible emergency with the Chinese.

The PAF had approximately 175 aircraft, 150 of which were combat aircraft. These were organized into nine fighter squadrons and two Canberra (B-57) squadrons. Overall, the IAF had nearly a four-to-one advantage, although in the main theater of combat in the west, it was about two-to-one.

It is not clear why the IAF decided to withhold nearly half of its air force against possible Chinese attack, since one advantage of air power is its ability to move quickly. Some retired officers argued, however, that the IAF infrastructure was limited, as was the capability of most of its bases to handle more than one squadron. Others said it was partly to have them immediately ready in the east. Differences of opinion exist on this point as some interviewees said that not all these squadrons were held in the east and that many bases could handle more than one squadron. Although official data could help to explain this point, none is available.

Also, the IAF apparently did not have a clear plan for the air war against Pakistan; at least it cannot be ascertained from the material available to the public.[16] The air force did not seem ready for a war with Pakistan, in spite of the earlier Pakistani actions in the Rann of Kutch. As a matter of fact, an IAF Vampire brought back conclusive evidence of Pakistani incursions into the Rann of Kutch—photographs of Pakistani tanks that appeared in Indian newspapers in the summer of 1965. Possibly this incident led the Pakistanis to withdraw from the Rann, resulting in a lull until the fall, which may have led some Indians to believe that the war had been averted. Even then, considering the ground and air actions in early September, the unprepared state of the IAF is somewhat hard to explain. In the war itself, the IAF exhibited a tendency to try to do everything: air superiority, counter-air, interdiction, close support, etc. The IAF was large and could afford some mistakes and losses, luxuries the PAF did not have.

In the early morning hours of September 1, 1965, Pakistani armor and infantry crossed the Line of Control and launched a conventional attack; irregular forces had already been operating in Jammu and Kashmir since early August. The attack in the Chhamb area of Jammu with Akhnoor as its objective was a complete surprise to the Indians. Chhamb-Akhnoor was an important area for India because if the Pakistanis broke through, they would cut communications between India and Kashmir. The initial Pakistani attack managed to penetrate the Chhamb sector sufficiently to threaten Akhnoor, and in

[16]Several retired Air Marshals say this assumption is not true and that the IAF had operational plans in hand; nevertheless, this view does not seem apparent from the conduct of the war.

the early afternoon, the Indian Army Chief of Staff was forced to ask the Minister of Defence for air support.[17] The IAF, alerted by the army attack, was able to launch four Vampires to support the hard-pressed Indian Army in just over one hour; later four more followed.[18] The Vampires, however, were no match for the Pakistan Air Force's Sabres and F-104s. Three were shot down, and a fourth was damaged and forced to return to base.[19] The IAF claimed that it had knocked out a number of vehicles and tanks and halted Pakistan's advance. Indian Army commanders, on the other hand, are unanimous in saying that the attacks did little good against the enemy and, in fact, destroyed a number of Indian Army vehicles and an ammunition truck. The air force sticks by its claims that it helped halt the Pakistan Army drive. This attack was the major air action during the first day of the war.

The PAF struck in both the east and the west. On September 6 in the west, the PAF had attacked Pathankot Air Base with eight aircraft and claimed to have knocked out approximately 13 Indian aircraft (including some MiG-21s) on the ground and unprepared for an attack.[20] One reason for this successful Pakistani attack was that the integrated Indian air defense system was not fully operational. Other planned PAF F-86 Sabre attacks on the Indian air bases of Adampur and Halwara, however, were much smaller and failed to hit the targeted airfield, but the attacking aircraft claimed that they shot down

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[17]Thanks to the rapid induction of the Indian 10th Infantry Division, Akhnoor never fell. In fact, the Pakistanis were surprised by the Indian Army's attack across the international border near Lahore, on September 6, and the Pakistani forces had to withdraw from the Chhamb area because of this threat.

[18]A few IAF officers have questioned why the IAF sent the old Vampires. One retired Air Marshal claimed it was the first air action of the war and the IAF wanted to keep it low key. Air Commodore R. J. M. Upot, "Decision Making Process in the Defence Services," *Indian Defence Review*, Vol. 1, p. 106.

[19]The PAF concentrated on air superiority with the view of providing for the air defense of Pakistan and the Pakistani army. The PAF seems to have rehearsed plans to attack Indian air bases in an effort to put the IAF out of action early on. It believed it had gained air superiority after September 7, a... 70 percent of the force was allocated to close support, a fact that the Indian Army also noted and wished its own air force would emulate. Pushpindar Singh, op. cit., p. 70.

[20]*The Story of the Pakistan Air Force: A Saga of Courage and Honor* [also referred to as *The Story of the PAF*], Islamabad: Shaheen Foundation, 1988, p. 364. Air Chief Marshal P. C. Lal admits damage to MiG-21s at Pathankot in *My Years with the IAF*, 1986, p. 132.

four IAF aircraft with a loss of two PAF aircraft. Air Chief Marshal Lal confirms these PAF losses but writes that the PAF did some damage to the IAF airfields.

On September 7, the PAF hit the Indian air base of Kalaikunda in the east with considerable success and claimed to have destroyed between 14 and 16 aircraft and damaged six to eight Indian aircraft on the ground at a cost of two Pakistani F-86s that were shot down.[21] The IAF had been caught unprepared on the ground with its planes neatly lined up and unprotected.

On September 7, the IAF countered with a major attack on Sargodha, Pakistan's largest air force complex with its cluster of five air bases, which held about 80 aircraft—more than 50 percent of the combat aircraft in West Pakistan.[22] The IAF launched 33 surprise sorties of Mystères and Hunters during the day. Since the PAF had constructed decoys and carefully dispersed and camouflaged its aircraft, the IAF aircraft had difficulties in spotting and hitting the planes. Little was accomplished. Sargodha also had some anti-aircraft defenses that made the IAF's job more difficult and dangerous. The IAF said it lost five aircraft out of 33; the Pakistanis claimed 11 downed. Given the importance of the target, the careful planning and practice, and the approximately 300 aircraft available to the IAF, this attack was surprisingly small and lightly pressed. The aviation author John Fricker has criticized the IAF attack on Sargodha, saying that it should have been directed against the three main PAF airfields, not just Sargodha, and pushed with greater determination. If this strategy had been used, the IAF could have seriously crippled the PAF.[23]

What might be termed the air war was most intense from September 6 to September 7; then it tapered off. Air-to-air combat was rare; although the IAF flew 1357 fighter-bomber sorties from September 6 to September 23, the Indians claimed few were challenged by the PAF. The IAF did not knock out the PAF, but neither did the PAF neutralize

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[21] *The Story of the PAF*, op. cit., p. 391. We use the Pakistani claims, because the Indian government has never released official figures, although it refutes the Pakistani claims.

[22] It is not clear why on September 6 the IAF did not attack to coincide with the army attack, possibly because they did not tell the IAF of its planned attack on that day.

[23] John Fricker, *Battle for Pakistan: The Air War of 1965*, London: Ian Allan, 1979, p. 116.

the IAF. Starting September 8 both sides began to conserve their aircraft.

Official statistics about the war are unavailable, and the claims of the two sides remain conflicting and contradictory.[24] One careful estimate of losses indicates that the IAF lost approximately 65 planes to all causes, of which 18 to 20 were knocked out on the ground at Kalaikunda and Pathankot.[25] These casualties were a relatively small portion of the total IAF—roughly one-fifth of the combat aircraft available in the western theater and just over one-eighth of the IAF's overall strength. The IAF claims that the PAF lost perhaps 25 aircraft out of approximately 150, or roughly one-sixth of its total combat power. Some Indians have argued that the IAF with its superior numbers could sustain such losses for a longer period, but the Pakistanis could not. Had the war continued, the PAF would have become noneffective. Not everyone agrees, however, that the IAF had much greater sustainability, as both air forces would have had trouble continuing to operate because of increasing shortages of ammunition and spares.[26]

Although some in the IAF have argued that the war was a great success, to an outside observer this does not seem the case. The smaller PAF sustained less than half the losses of the larger IAF. One may ask

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[24] *The Story of the PAF*, op. cit., p. 427, states that after the war the Pakistan government compiled its own list of downed aircraft for both sides and concluded that the IAF had lost 54 aircraft against the 19 that the PAF lost. If the Indian government has done a similar study, it has not made it public.

[25] Pushpindar Singh, Ravi Rikhye, and Peter Steinemann, *Fiza'Ya: Psyche of the Pakistan Air Force*, New Delhi: The Society for Aerospace Studies, 1991, p. 42, state that the IAF lost 65 aircraft to all causes, but all retired IAF personnel said this figure is high. They also agree that the PAF lost more than the 25 cited in *Fiza'Ya*, whose arguments seem quite fair and reasonable. Singh is an Indian. He is considered just a journalist by some; others feel he is one of the best informed people on the IAF. The PAF has stated that its losses were 19 aircraft, which it claims the United States Military Assistance Group (USMAG) confirmed. It also claims that the IAF lost 54 aircraft. See *The Story of the Pakistan Air Force*, op. cit., p. 429. More accurate figures may be available when both sides release official information on the war.

[26] Even though air-to-air combat was rare because of deficiencies in the Air Defence Ground Environment System (ADGES) on both sides, a few of the engagements were spectacular and accordingly reported. Noteworthy were those involving the famous F-86 Sabre of the PAF and the Follard Gnat of the Indians, which was to earn the nickname "Sabre Killer" in the Indian press. The Gnat's diminutive size and agility made it a formidable dogfighter.

why the IAF did not do better. A number of reasons have been put forth. As mentioned earlier, the IAF was in the midst of a great expansion program and was neither prepared nor psychologically ready to fight a war. On the other hand, for some time the PAF had been equipped and trained by the United States and was ready to fight. The United States had provided the Pakistanis with air-to-air missiles and a modest air defense system. The Indians had only started their air defense network, and it proved to be not as effective as that of Pakistan. The great variety of aircraft in the Indian inventory complicated both training and maintenance problems and may be the reason for the limited number of sorties generated and the ineffectiveness of some of the attacks. Overall, the IAF was less prepared and ready than the PAF for an air war.[27]

In addition, neither the army nor the air force was prepared for joint air-ground operations, even though a Joint Army-Air Operations Instruction existed that contained some procedures for the allocation and use of air resources. Both the air force and army admitted that serious shortcomings existed in executing the land-air battle. Air Marshal Lal wrote that the air force "was found wanting" in its close support of the ground forces.[28] The Western Army commander, General Harbakhsh Singh, has written, "close air support was neither very effective nor timely for a variety of reasons."[29] He devotes a small section of his book, *War Dispatches*, to close air support and outlines the shortcomings of air-ground cooperation as he saw it.[30] He felt that the aircraft were improperly allocated; specifically, he felt that the Western Air Command held too many aircraft for its own mission of air defense. He also criticized the Joint Army Air Operation Center (JAAOC) for releasing too small a portion of the aircraft to the corps and attempting to target the aircraft for the corps. Those targets selected often were not what the corps needed or

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[27]See *The Story of the PAF*, op. cit., pp. 431–436, for a complete and frank critique of the air war.

[28]Lal, *My Years with the IAF*, op. cit., p. 164. He further wrote that the 1965 war demonstrated the deficiencies in army-air cooperation at all levels of command.

[29]Lieutenant General Harbakhsh Singh, *War Dispatches: Indo-Pakistan Conflict 1965*, New Delhi: Lancer International, 1991, p. 198.

[30]Ibid., pp. 170–177.

wanted. Those who needed the aircraft did not have them available on a timely basis.

Furthermore, he stated that poor communications existed between the air force units and between the two services. For example, it was never intended that the JAAOC should directly communicate with their wings; and so communications were not established. Indeed, the rather primitive communications of both services certainly complicated cooperation on close air support. Some air force officers feel they did quite well considering the "antique" communications. But General Singh complained about the poor quality of the liaison officers; he felt that they were lacking in professional as well as physical qualifications. All in all the system did not work as well as hoped, although there were instances of important support to the army.[31]

In contrast, the PAF seemed to the Indians to have provided prompt and continuous support to the Pakistani ground forces, and their two services seemed better prepared and trained to work together. However, some sources suggest that the Pakistan Army and Air Force were also deficient in air-ground operations.[32] In any case, after 1965, the Indian forces took steps to improve the situation, which seemed successful, as will be shown in the description of the 1971 war (next section).

The Indian Air Force, on its part, felt that the lack of forward bases nearer Pakistan hindered its support for the army. After the war, it constructed bases at Jaissalmer and near Barmer. The IAF also realized that its aircraft shelters did not offer adequate protection against low-level attacks practiced by the PAF, and so began construction of better shelters using concrete and earth with overhead and entrance protection. The air force also moved its training center from Jodhpur, which was located close to the front, and transformed Jodhpur into an operational base. The IAF also realized that it was

[31]The Indian Air Force mainly used Mystères and Hunters with air cover by Gnats for most of its ground support sorties.

[32]Pushpindar Singh et al., *Fiza'Ya*, op. cit., p. 41. See also Lieutenant General Gul Hassan Khan, *Memoirs of Lt. Gen. Gul Hassan Khan (The Last Commander in Chief of the Pakistan Army)*, Karachi: Oxford University Press, 1993, p. 177. In an interview with the senior author, however, Lieutenant General Gul praised the PAF for its substantial support for the army. Islamabad, September 13, 1993.

important to assign and have specific air units available to the Tactical Air Centers, which would work closely with the army formations in the area. Indian air-ground operations did not function well in the 1965 war.

## INDO-PAKISTANI WAR OF 1971

Between the 1965 and 1971 wars, the air balance between India and Pakistan shifted considerably. While the IAF continued to acquire modern jet fighters in large numbers, it kept many of its older fighters and probably had well over 700 combat aircraft in 39 squadrons at the outbreak of the war in 1971. These aircraft included Canberra medium bombers, Gnats, Mystères, Hunters, MiG-21s, Marut HF-24s, and a small number of newly purchased Su-7 attack aircraft. The IAF improved its tactics and techniques as a result of the 1965 war. Since Pakistan could not replace U.S. aircraft because of the continuing U.S. arms embargo, it was forced to purchase 90 second-hand F-86s from Germany, was given 74 old MiG-19s (the F-6) by China, and purchased 30 new Mirage IIIs from France.[33] Its total combat aircraft numbered about 240 to 250. The IAF was in much better shape than in 1965; the PAF was not.

By the spring of 1971, India had decided to intervene militarily in East Pakistan, where there had been increasing unrest and resentment against political domination by West Pakistan. The Eastern party, the Awami League, in the December 1970 elections won a majority of seats in the Pakistani Parliament but was not allowed by West Pakistan's leaders to form a government. The independence movement grew. In March 1971 Sheikh Mujibur Rahman, the Awami leader, declared independence, and the East called itself Bangladesh. The *Mukti Bahini* (People's Army), trained and assisted by India, began a campaign against the Pakistan Army and government. Many thousands of refugees left the East for India, creating serious problems in Bengal and for the Indian government.[34]

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[33]Pushpindar Singh et al., op. cit., p. 52.

[34]For a detailed discussion of the political dimensions of this war, see Richard Sisson and Leo E. Rose, *War and Secession: Pakistan, India and the Creation of Bangladesh*, Berkeley, Calif.: University of California Press, 1990.

As a consequence, Indira Gandhi, the Indian Prime Minister, decided to seize the opportunity to dismember India's arch regional rival, Pakistan. India prepared a military operation to aid the guerrillas and to help establish a new nation of Bangladesh. The Army Chief of Staff, General Sam Manekshaw, had insisted that the operation would take quite a few months to plan; Mrs. Gandhi allotted this time. From the beginning General Manekshaw included the navy and the air force in the planning, something not previously done, although he had assumed responsibility on his own for the war preparations and later for the war itself. He wanted a quick war and worked out a plan for the attack on East Pakistan, which involved a multipronged army offensive bypassing Pakistani strong points, with the navy blockading the sea routes to the Eastern province and the air force gaining local air superiority.[35] The campaign was planned carefully in East Pakistan, including some practice exercises and a joint effort that paid rich dividends both in results and in the limited number of casualties suffered by the Indians.

The Indian strategy in the West was essentially for a defensive posture, although two limited offensive operations were envisaged to keep the Pakistanis off balance.[36] Since the West was not considered the important theater of operations, the Indians did not emphasize joint planning or careful preparations for war. On November 21, the Indian Army, which had earlier made temporary forays into East Pakistan to aid the *Mukti Bahini*, entered on a longer-term basis, although it limited itself to small actions. The carefully planned Indian offensive in the east did not begin until December 3. See the maps in Figure 4.3.

The IAF allocated ten fighter squadrons and one Canberra squadron to the Eastern theater; the PAF maintained one squadron of F-86s on one main base in the East although it had two other secondary inactive bases. The IAF planned on gaining quick and complete air su-

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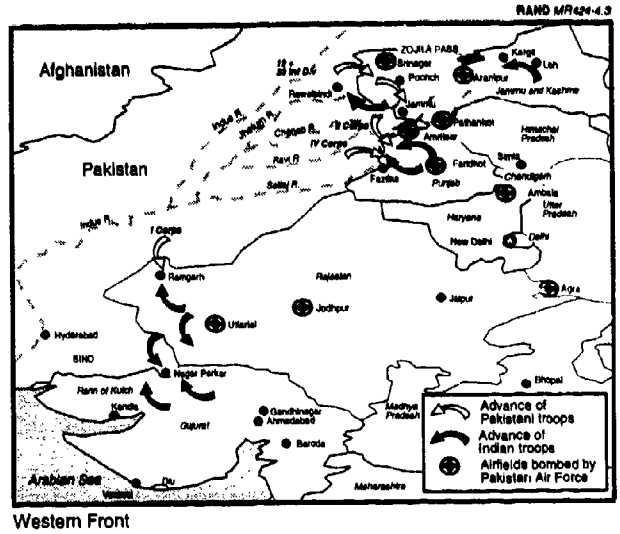
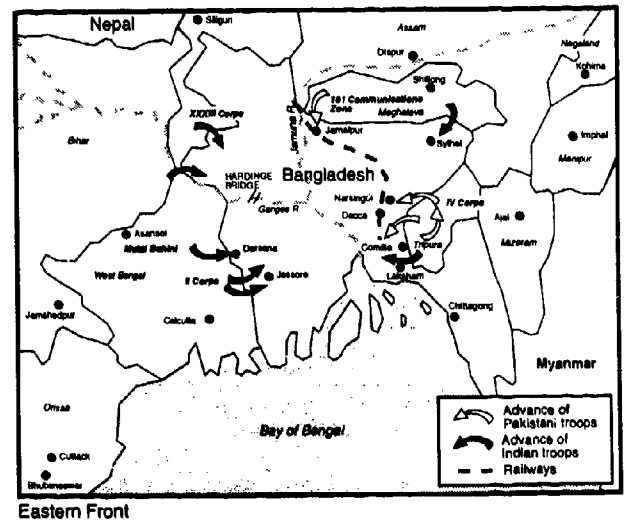
[35]Both India and Pakistan knew that if war occurred, they had to act quickly before international intervention could stop the hostilities.

[36]See Major K. C. Praval, *Indian Army After Independence*, New Delhi: Lancer International, 1990, p. 361; Air Chief Marshal Lal, *My Years with the IAF*, p. 162; and Rajesh Kadian, *India and Its Army*, New Delhi: Vision Books, 1990, p. 63. It is true that although General K. Candeth tried to develop a plan, it was never accepted by the army high command.



Western Front



Eastern Front

**Figure 4.3—Indo-Pakistani War of 1971**

periority. It is not clear what the Pakistanis hoped to gain from their one squadron in East Pakistan. In the Western theater, the IAF allocated 12 fighter squadrons and 2 Canberra squadrons, and a few were shifted from the East after air superiority was gained there. Indian air strategy in the West was to gain air superiority and to support the ground forces. In the air overall, the Indians had the quantitative and qualitative advantage in aircraft.

In the East the Indian forces moved swiftly against the dispersed units of the Pakistan Army and the small PAF contingent of one squadron of fighters (F-86s). In a few days, the IAF with ten squadrons of fighters gained complete air superiority over the outnumbered PAF, whose only air base had been knocked out by December 8 and all aircraft destroyed—some by the Pakistanis themselves to keep them from falling into the hands of the Indians. This air superiority allowed the Indian Army to build bridges across the rivers, to conduct the first helicopter-borne army operations in Indian Army history, and to advance rapidly with close air support and without fear of enemy air attack. IAF control of the air permitted a paratroop drop on December 11[37] and also allowed Indian naval ships freedom of action around East Pakistan in the Bay of Bengal.[38] In the East, 60 percent of the IAF was initially allocated to close support for the army as Air Chief Marshal Lal was determined that the air force would not fail the army again. After the first few days and the destruction of the PAF in the East, all IAF units supported the ground forces, and some were transferred to the West.[39] Indian ground forces were on the outskirts of Dacca by December 14, with heavy street-to-street fighting ahead because the Pakistan Army Commander, General Niazi in the East, was unwilling to surrender.

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[37]The first ever heliborne operation was undertaken successfully near Sylhet on December 7, 1971. Major General Rajendra Nath, *Military Leadership in India*, New Delhi: Lancers Books, 1990, p. 519.

[38]The navy launched about 160 sorties from the carrier *Vikrant*, mostly against coastal targets, but a few were against the airfields at Cox's Bazaar and Chittagong. The latter was used to evacuate personnel to Burma.

[39]The IAF Eastern Command flew 1978 sorties between December 3 and 11; 1178, or about 130 per day, were in direct support of the army. In fact, the air force, somewhat bitter over its own high losses to ground fire when in support of the ground forces, complained that the army called for air support when its own forces (artillery) could have handled the problem.

One precision attack conducted by the IAF during the campaign in East Pakistan speaks volumes about its high state of operational proficiency. To break the will of Pakistan's political and military leadership in the East, on December 14, the IAF executed a series of well-timed and very accurate attacks on the Governor's house in downtown Dacca, just when a meeting was in progress. As observed by foreigners in the Oberoi Hotel, this was done without any collateral damage (and without precision munitions being used.)

The short campaign in the East had cost the IAF about a dozen aircraft, 10 or so to ground fire while providing low-level close support to the army and only one in air-to-air combat. From November 21, the PAF appears to have lost about eight aircraft in air-to-air combat, with the remaining 12 aircraft destroyed on the ground. Indian forces entered Dacca on December 16. Mrs. Gandhi announced a unilateral cease-fire, and a truce was entered into on December 17.

In the West, on December 3, 32 Pakistani aircraft (F-86s and Canberras B-57s) launched preemptive attacks against several Indian air bases and radar stations, and the war officially began.[40] That night the PAF followed the attack by sending 18 B-57s against airfields and other military installations. None of these attacks caused much damage. The IAF responded with attacks on Pakistani bases, but these were also not very successful. Continued counter-air attacks had very limited results.[41] Thus, the IAF concluded that the usefulness of bombers was waning, and the future emphasis must be on fighters.

On December 4, the IAF and Indian Navy conducted dramatic attacks on Karachi, with both claiming responsibility for the considerable damage believed to have been inflicted.[42] The IAF sent Hunters and Canberras, losing one of the latter. Pakistan apparently did not

[40]A high number of Bengalis were in the Pakistan Air Force, perhaps one-third of its personnel, and most of them favored the insurgents, not the Pakistan government's forces; they were not used during the war. This policy caused some degradation of PAF effectiveness.

[41]Generally, counter-air efforts were not productive because of poor bomb sights and iron bombs.

[42]See Commodore K. P. Gopal Rao, MVC USM (retired), "Distortion of Indian Naval History—1971," *Indian Defence Review*, July 1990, pp. 42-50, for careful evaluation of the naval and air force claims concerning the Karachi raids.

expect such Indian attacks and was completely surprised. The PAF's failure to protect Karachi created quite a furor in Pakistan. Most PAF units were far from Karachi in the north, where the greatest military action was expected. Additionally, the PAF seemed to be trying to conserve its forces. Jordan sent ten F-104 Starfighters from its air force to assist Pakistan, and this small contingent deployed in the south, most probably to help protect Karachi. It reportedly lost four of the ten aircraft by the end of the war.

The air war slowed down considerably as both sides realized that the attacks on each other's air bases were largely ineffective. Few classic dogfights occurred, but the aging Hunter force suffered losses because of the aircraft's slow speed and long ranges to targets. The IAF, however, continued its strong close support to the ground forces and suffered serious casualties.[43]

In the 1971 war, the IAF won complete air superiority in the East; in the West, however, both air forces claimed air superiority. In fact, each air force appeared to have local superiority at different times in different places. Official figures on air losses are not available.[44] The PAF admits losing 34 aircraft, but claimed over 100 Indian aircraft.[45] Air Chief Marshal Lal (IAF) cites an India press handout stating that India lost 42 aircraft and Pakistan 86.[46] In *Fiza'Ya*, the figures cited are 50 PAF losses and more than 100 IAF losses.[47] A large percentage of the IAF losses were from ground fire while IAF aircraft were providing close support for the Indian Army.[48]

The PAF strategy was to conserve its aircraft to support a major Pakistan Army offensive in the West, which never took place, and to provide a last-ditch strategic reserve in case the Pakistan Army lost

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[43]The Su-7, a large aircraft, originally built to deliver nuclear weapons, was used for close support, incorrectly, according to the Soviets. This error led to high losses by ground fire. See Pushpindar Singh et al., *Fiza'Ya*, op. cit., p. 59.

[44]For a useful discussion of air losses and the difficulty of determining them accurately, see Pushpindar Singh et al., *Fiza'Ya*, pp. 57, 64–67.

[45]*The Story of the PAF*, op. cit., p. 470.

[46]Lal, *My Years with the IAF*, p. 321.

[47]Pushpindar Singh et al., p. 67.

[48]Interestingly, *Fiza'Ya* computes loss per sortie in the West to be .012 for both air forces. Pushpindar Singh et al., p. 67.

on the ground. The PAF claimed that at the end of the war it had carried out this strategy. However, in a continuation of the war, the IAF would have outlasted the PAF because of its numerical superiority and because, whereas the IAF could easily get replacements from the Soviet Union, the United States had stopped all aid to Pakistan. Mrs. Gandhi's unilateral cease-fire on December 17 did not allow this hypothesis to be tested.

The Indians concentrated in the East and were euphoric over their great victory there. They had gained air superiority in three days and complete victory in fourteen. Although Pakistan felt humiliated in the East, most of its forces were intact in the West on December 17, the date for the end of the war.

Joint air-ground cooperation had improved, but problems remained in spite of earlier efforts at resolution.[49] Air-ground procedures had been developed. Forward air controllers, who knew the pilots of the supporting aircraft, directed air operations in support of the army, thus ensuring effective execution. The lack of modern communications continued to hamper army–air force operations. The IAF also lacked the specific munitions required for success in the close support role. Disagreement arose on how to request air support; the army preferred to request so many aircraft, while the air force wanted a request against a target that would allow them to decide the quantity and type of aircraft to send. The air force complained that the army was requesting air attacks on targets that the army's own weapons could have taken care of better. But there was great improvement over 1965.

Air Chief Marshal Lal has written that the air force had an air campaign plan of its own that did not directly affect the army. Given the short length of the conflict in the East, this campaign was conducted in the West. In the West, the air force undertook what might be called a strategic campaign to destroy all Pakistani sources of energy, i.e., field storage facilities, gas plants, refineries, and power stations, as well as the transportation system. Lal claims that this plan was successful; the Pakistanis admit that they were hurt badly by these

[49]Lal, op. cit., criticizes the peacetime air-ground exercises as unrealistic (p. 241). He also states that the army did not seem interested in air support (p. 225).

attacks.[50] Lal believed that this overall strategy should be a basic part of the future air force strategy.[51]

## CONFLICTS IN SRI LANKA AND THE MALDIVES

In addition to these four wars, the air force was involved in two other military operations in subsequent years. In July 1987, after negotiations with Sri Lanka, India sent the India Peace Keeping Force (IPKF) to protect the Tamils, to arrange a cease-fire between the Sri Lankan government and the Tamils, and to preserve the integrity of the country.[52] The primary army force was supported by both the navy and the air force. Reaching a level of about 100,000 men, the force stayed for 32 months and was pulled out in March 1990 at the request of the Sri Lankan government. It was a bitter counter-insurgency operation against a very determined and tough foe, the Liberation Tigers of Tamil Eelam (better known as the LTTE). Fighting between the LTTE and the Sri Lankan government is continuing—although without Indian participation.

The air force's primary contribution was to provide transportation. It ferried troops across to Sri Lanka on July 30, the day after the signing of the agreement with the Sri Lankans, and continued to airlift troops and supplies to the island for the duration of the operations. It was the most massive airlift operation, using mostly Soviet-built AN-32s, in Indian history. More than 70,000 sorties were flown without the loss of a single aircraft.[53] Air force helicopter gunships (MI-8s and

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[50]Author's interviews with two former PAF Air Chiefs, Air Chief Marshals Zulfiqar Ali Khan and Jamal A. Khan, in September 1993, Islamabad. See also *The Story of the Pakistan Air Force*, op. cit., p. 443.

[51]Although this mission is accepted by today's IAF, it is not a primary mission. India still expects all wars to be short, and the effects of such a strategy usually take time before the enemy's operations are affected.

[52]Some dispute exists over the reasons for sending the force, but these three seem generally accepted. Also, it is true that as the struggle continued, the IPKF ended up fighting the Liberation Tigers of Tamil Eelam (LTTE).

[53]"The Indian Air Force in Sri Lanka: An Initial Assessment," no author, *Vayu Aerospace Review*, 1/1990, p. 25. In fact, Pushpindar Singh told the senior author that he had written the article after a seven-day official visit to Sri Lanka with the IAF. Interview of George Tanham with Pushpindar Singh in Delhi.

MI-25s) also supported the ground forces. However, as in India's other conflicts, this operation was primarily an army effort.

In November 1988, a coup was attempted against the government of the Maldive Islands, which called for help from several nations. The Indians responded quickly, and the IAF in Operation Cactus flew Indian paratroopers 2000 kilometers from Agra to the Maldives.[54] They quickly defeated the rebels, restored order, and ensured government security. The air force again demonstrated its transport capabilities. It was also a dramatic illustration of India's ability to airlift at least one battalion more than 1000 kilometers on very short notice.

## SOME OBSERVATIONS

A few observations can be made about these Indian wars and operations:

- The army is the paramount military force in India and has been the primary force in fighting India's wars. It has dominated Indian thinking about defense.
- The IAF has not figured prominently in Indian thinking about defense. The army seldom included the air force in its thinking or plans. The exception was in the 1971 war when General Manekshaw, early in planning and during the war, consulted closely with the other two services. Although there was a joint effort in Sri Lanka, one army general at least has complained that the air force and navy did not adequately support the army.[55]
- At least from the outside, it appears that the air force did not take the initiative in pushing concepts of air power or in preparing an air plan for the defense of India. While it did not wish to appear as just a supporting service, the IAF was largely forced into that role. The IAF did concentrate on gaining control of the air by conducting air defense with interceptor aircraft and air strikes against the enemy air bases. This after all was the important air

[54]Agra is the base for the Indian Parachute Brigade and the IL-76 Strategic Transport Squadron.

[55]Lieutenant General Depinder Singh, *IPKF in Sri Lanka*, New Delhi: Trishul Publications, n.d., p. 59.

force role that it could conduct alone, but even here its contribution was limited.

- Air-ground operations have been a controversial subject, with some in the military arguing that they had not gone very well, except in 1971, while others claim they were performed quite satisfactorily.
- All the wars with Pakistan have been short, and so India's greater air (and ground) resources and staying power did not come into play.[56]

India faced these wars as it struggled to build a new air force. Tensions with Pakistan and, especially, the PAF's reorganization and reequipment with U.S. systems in the 1950s spurred the Indians to expand the force quickly. At the same time, there was growing sensitivity to the degree of leverage the British could exercise through the supply of arms. Thus, as the IAF was procuring Canberra bombers, Gnats, and Hunter fighters from the British in the 1950s, they also purchased the Mystère from the French and began their program to design an indigenous fighter—the Marut.

With the trauma of the defeat by the Chinese in 1962 and the Western democracies' poor performance as a reliable source of arms, the Indians turned to the Soviets. This move was motivated in part by the ideological inclination of Krishna Menon, India's Defence Minister, and cemented by the favorable terms the Soviets offered. The simultaneous efforts to build the force while controlling costs, to maintain some independence, and, at least, to minimize the degree of dependence on any one supplier resulted in a process that sometimes sacrificed operational effectiveness and too often sacrificed coherence in procurement strategy. These issues are explored in greater depth in subsequent chapters.

[56]At the same time, the IAF has suffered from particularly limited supplies of munitions, in part because of the multiplicity of fighter types in the force. This limitation could have imposed some difficulties in wars that lasted longer than 2 weeks.

## ROLES AND MISSIONS

Until IAF documents are made available for public use, any discussion of roles and missions and doctrine must be tentative. Also, as in most air forces, different views exist even on major points of doctrine. For example, some officers stress defensive air defense and others stress more offensive tactics such as strikes on enemy targets; some, including the present Chief, Air Chief Marshal Kaul, favor a balanced force.

From its inception in 1932 through the 1965 war, the Indian Air Force seems to have based much of its thinking on RAF doctrine and practices. This position is not surprising as many Indian Air Force officers were trained by the RAF, and the Indian Air Force had almost exclusively British aircraft in its early years. Furthermore, the IAF fought alongside the RAF in the Burma campaign, where it was a totally tactical air force that concentrated on close support of its army with some attention to reconnaissance and interdiction missions. At the time, RAF doctrine emphasized the bomber as the key force in air warfare. Offensive operations against the enemy were the way to win a war. Fighters were seen as primarily defensive weapons. The IAF initially sought bombers; it tried to use a few USAF Liberators after World War II and bought Canberras. After the 1965 war, however, when the Canberras did little good, the IAF turned exclusively to fighters. RAF pilots in the attack mode usually attacked low level, and as one Indian Air Force Marshal said, flew by the seat of their pants.[57] The latter was a great RAF tradition—many Indian Air Force personnel were attracted by it, and some still are.

At first the IAF's mission was merged into the general mission of the armed forces: to defend India from foreign attacks. In fact, this general mission is maintained today, although the air force has developed some more precise roles. The issue was addressed explicitly after the 1965 war and more particularly in 1969, when Air Chief Marshal Lal, then Chief of the Air Force, decided that the air force had to establish a clearer set of priorities. He has written of four: First and most important was the air defense of territorial India. Second was strike missions to neutralize enemy air forces or counter-

[57]Discussion of the senior author with an Indian Air Marshal who did not wish to be identified, New Delhi, February 1993.

air, usually considered an important part of the first mission. The third was support for the army and to a lesser extent the navy. The fourth was the transport of supplies and paratroopers. The Indian Air Force adhered to these priorities when it entered the 1971 war, although Lal was determined that the IAF would support the army better in the next war, and it did.

The current five major roles of the IAF are summarized as follows:[58]

- *Air defense of India.* This is first and still the top priority of the IAF. In the air force leadership's eyes, this role is critical not only from a national but also from a political point of view. No enemy planes should be allowed to hit vital installations in India. A separate issue and not quite as important a priority is air defense of the army—the need to keep enemy air from interfering with Indian Army operations.
- *Strike missions.* These missions contribute to the air defense mission through the destruction of enemy air targets, air bases, and installations. Such strikes help reduce an enemy's war-fighting capability by interdicting enemy lines of communication and destroying economic targets, power grids, and other vital installations. It is almost a strategic bombing effort.
- *Close support for the army.*[59] In some discussions, this mission has the second priority. It will likely depend on the army's needs, the air situation, and the availability of aircraft. Nonetheless, the heavy IAF emphasis on this role provides some indication of the army's preeminent place in Indian defense policy.

  The air force does envisage some support for the navy—particularly in defense of its ships and installations—although it does not see that this is as important as army support. Only one

[58]The composition of the aircraft and equipment of the IAF indicates that Pakistan is perceived as the primary enemy. If China had been seen as the chief enemy, the priorities would have been long-range air defense fighters, air refueling for Deep Penetration Strike Aircraft, and long-range reconnaissance (unless a close-in defense was envisaged).

[59]One air officer has argued that close air support by the air force will be less important as the army develops its own armed helicopters, which are likely to be more cost-effective. See Air Marshal R. D. Sahni, "India's Air Power Strategy for the 1990's," *International Defense Review*, January 1990, p. 44.

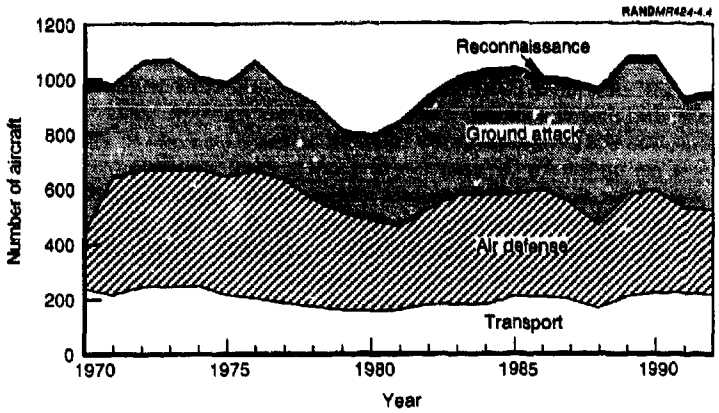
squadron of Jaguars is dedicated to this role, and some other air force units are assigned to maritime support as a secondary role.

- *Airlift.* This mission involves transporting supplies for the IAF and the army, airlifting troops, and delivering paratroopers. Numerous examples of the importance of this mission are seen over the years from Kashmir in 1947, to Sri Lanka in 1987–1990 and the Maldives in 1988. The long-range transports, IL-76s, are particularly important for supporting power projection operations, as in the case of the Maldives.
- *Strategic and tactical reconnaissance.* A small number of aircraft are devoted to this mission, notably modified Canberras and recently acquired MiG-25Rs. Strategic reconnaissance missions are controlled by the highest level of the civilian government, not by the IAF.[60]

When looking at the overall force structure in support of these various mission areas, one notes that the transport fleet has formed a fairly steady—and significant—proportion of the overall inventory. The IAF has also maintained a small number of aircraft assigned to tactical reconnaissance missions. In terms of combat aircraft, in general the IAF has split its fighter inventory fairly evenly over the past two decades between air defense and ground attack missions. Figure 4.4 illustrates the breakout of the primary missions of the various aircraft maintained by the IAF. As shown, the number of ground attack relative to air defense aircraft has grown somewhat.

Moreover, many squadrons in the IAF (such as those equipped with the MiG-21) tend to be assigned a primary role (depicted in Figure 4.4) but have capabilities in the other roles. For example, one senior IAF official claimed that *all* MiG-21s can be used in ground attack operations if necessary, but not all can be used in air defense operations, the original mission of the MiG-21. The IAF also plans to exploit the multirole capabilities of the Mirage 2000 (which was procured primarily with air defense in mind). That said, training pilots for a variety of roles requires additional training hours to maintain effectiveness—and training times have declined in recent

[60]In 1975, the IAF was directed to transfer its land-based, fixed-wing maritime reconnaissance aircraft (Super Constellation) to the navy.




SOURCE: International Institute for Strategic Studies, *The Military Balance*, 1970–1993. Maritime surveillance/anti-submarine warfare assets are not included in the reconnaissance category.

**Figure 4.4—IAF Mission Emphasis**

years as budgets have contracted. Nonetheless, the increasing IAF emphasis on multirole indicates an attempt to extract the maximum flexibility from its forces. It also represents a significant break with RAF doctrine, which has emphasized specialization for its fighter forces.

Since air defense of the country is the highest priority mission of the IAF, it would be useful to look more carefully at its air defense doctrine. The IAF sees the air threat as primarily one from low-level air attacks that allow attacking formations to penetrate beneath the early radar horizons. Again perhaps reflecting RAF traditions, both Pakistanis and Indians have trained for such operations. The need to deal with low-level threats led the IAF to recognize the importance of visual detection. Consequently, the air force early on formed a mobile observation force that mans the northern and western borders to detect incoming aircraft and reports to air force higher headquarters. The air force apparently has also worked out procedures with the

railroads and police for them to watch for aircraft and report through communications systems available for this purpose.

The IAF continues this visual effort even though low-level radars are available that can detect low-level penetrations. The air force, however, has not procured many modern technologies. In 1974, the air force set up the Air Defence Ground Environment System (ADGES), a radar network along the western and northern borders. Although it has been upgraded somewhat, the network does not appear to have many of the latest detection devices. (The Indra I and II radars produced in India, however, should provide some updating.) The regional air commands provide air defense nerve centers located on the border to detect, track, and identify incoming aircraft. Further details of the air defense system and its efficiency are not available. The continuing lack of airborne early warning aircraft obviously is a serious limitation.

The IAF depends on interceptors and strike aircraft for air defense; however, surface-to-air missiles (SAMs) are available in limited quantities. The exact current figures on SAMs are not available. The rather old SA-2s have been phased out. More modern surface-to-air missiles were acquired in the 1980s and include the SA-3 Pechora for low-level defense acquired in 1981, the shoulder-held SA-16 Ingla-IM short-range SAM in 1989, and the mobile SA-8-8 OSA-AKI-M in 1990.[61] The air force puts its emphasis on aircraft but is using SAMs around certain key bases and headquarters. The doctrine is to declare certain areas around their installation off-limits to aircraft; in these limited areas, the SAMs are allowed to fire freely. These designated areas may change, and the firing of SAMs may be restructured at certain times, e.g., to allow friendly aircraft to return to their bases. The procedures are controlled by the relevant base headquarters; but the higher headquarters usually have the final decision.

The IAF cooperates with the army on air defense as the latter has a considerable air defense capability of its own. It has a large number of its own SAMs, far more than the air force. These include the SA-6, SA-9, SA-11, SA-13, and Tigercat. Most of these missiles are mobile and accompany the operational units; however, some are placed

[61] Pushpindar Singh, "The Indian Air Force Equipped for the Nineties," *Asian Defence Journal*, September 1991, p. 42.

around key headquarters and cities. The army also has anti-aircraft guns. In the operational units, the anti-aircraft guns and SAMs are free to fire at all times, except when friendly aircraft are providing support to army units. The army controls its anti-aircraft weapons. It is believed that the Joint Operating Centers (JOCs) coordinate the arrival of friendly aircraft with restrictions on the firing of the army anti-aircraft weapons. They do not exercise perfect control, and, as in all other such situations in the world, instances occur when friendly aircraft may be shot down, but the coordination is claimed to work reasonably well.[62] The army's large air defense capabilities may also reflect concerns about the capability of the IAF to provide control of the air over army units.

The IAF believes that it must be prepared to support the army and to a lesser extent the navy. Efforts to improve air-ground cooperation have continued since the 1971 war, when it seemed to work fairly well. Currently, both army and air force officers say that joint procedures in writing exist for air-ground cooperation as well as parallel organization in the two services for close support operations. Advanced air force headquarters have been establilshed near the regional army commands, are commanded by air commodores, and are intended to work closely with the army. At the corps level, an IAF Tactical Air Center and a Joint Operations Center work out the actual operations. At the brigade level, forward air controllers are available to control the aircraft supporting the army units. It is not clear how often these procedures are actually exercised with live forces of the army and air force, because of financial constraints; however, some biannual and annual exercises are held. The army has voiced some concern about the seriousness of the air force in supporting it; some army officers consider air support a bonus. The air force maintains that it will support the army as one of its top priorities.[63] Differences between the army and the air force on these matters are not unique to India.

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[62]The last two paragraphs are based on a discussion with two retired Indian Air Marshals who prefer to remain anonymous.

[63]In September 1993, the present Chief of Air Staff, Air Chief Marshal P. K. Kaul, told the senior author that he considered support for the army as important as any air force mission.

Chapter Five

# TRAINING AND MAINTENANCE

## TRAINING

Since training is essential to the functioning of any air force, the IAF created a training command with headquarters located in Bangalore and a number of installations located mainly in southern India. Such installations include schools for training pilots, navigators, instructors, and technicians. The command also includes schools for administration, air defense and safety, and institutions for developing equipment as well as tactics. The Training Command has approximately 250 aircraft to perform its training mission.

Although all aspects of training are important, pilot training is critical and has attracted much attention recently. Apparently some difficulty has arisen in recruiting pilots, even though the yearly quota of 100 is relatively small.[1] Many of those recruited do not wish to become fighter pilots, as transport pilots have a better future in the commercial aviation world.

Phase I IAF pilot training and the fixed-wing portion of the helicopter training are conducted at the Indian Air Force Academy at Dundigal located just north of Hyderabad. Fixed-wing pilot trainees begin "ab initio" (primary) flight training in either the HPT-32 or the Kiran Mark II aircraft. The HPT-32 is a single-engine aircraft manufactured

[1] *Report of the Comptroller and Auditor General of India for the Year Ended 31 March 1992, No. 9 of 1993* (hereinafter referred to as the CAG report), Union Government, 1993, pp. 12–13; a conversation between the senior author and a retired IAF officer revealed some shortage problems.

manufactured by HAL, is basically a copy of the British-designed Jet Provost (complete with the Viper engine).

Until several years ago, all pilot trainees began their training in the Kiran Mark II. When the new HPT-32 became available, the IAF decided to compare the progress of those students who received initial training in the HPT-32 with the progress of students entering directly into the Kiran. The result has shown that HPT-32 students have progressed more rapidly through the required syllabus and achieved a lower failure rate. On the basis of the success of the HPT-32 training, the IAF now starts approximately 50 percent of each entering class in the HPT-32 while the rest still begin with the Kiran. As soon as sufficient HPT-32s are available, the IAF intends to start all new trainees in that aircraft.

At the end of the 6-month first phase, students enter the 6-month Phase II. In this phase students fly either the Kiran Mark IIA or the Polish Iskra. In addition to advanced pilot training, including instrument training, formation flying, and advanced navigation, all students learn the basics of gunnery and bomb delivery in Phase II (the Mark IIA is a weapon-capable version of the Kiran Mark II, and the Iskra also has a very basic weapon-delivery capability).

After Phase II, student officers receive their commissions and are awarded pilot's wings. They then enter Phase III, either as prospective fighter pilots or as transport pilots (in Indian parlance, they are "bifurcated"). If selected for MiG-series fighters, they will receive advanced flight training in the MiG-21, while those assigned to fly Western aircraft have trained in the Hunter. Recent reports, however, indicate that the last of the Hunters has been retired, and it is not known in what aircraft pilots are trained.[2]

Pilots who select transport aircraft are sent to the Transport Training Wing at Yelahanka, where they are trained for approximately 120 hours in 22 weeks on the HS-748 or the Soviet AN-32. Pilots selecting helicopters usually leave after Phase I of the basic pilot training and

[2]The Hunter was officially retired in 1991, but because of the lack of a replacement aircraft, some may still be in use.

are then sent to Hakimpet.[3] This progression is the official training schedule, although a two-phase combat pilot training is under consideration that would reduce the overall training to one year instead of two. Current financial constraints may force changes in the flying hours and actual training of pilots.

In fact, the Training Command seems to have been neglected in many ways, which has led to serious training problems for the IAF. The introduction of the HT-32 came late, because of delays at Hindustan Aeronautics Ltd., India's government-owned aeronautical manufacturer. When it was received in the early 1980s, it was already almost out of date. MiG-21 training aircraft are not good trainers, are not user-friendly, and are old.

In spite of its requests, the air force has no advanced jet trainer and none on order.[4] In India, the services can only request arms and equipment; the Ministry of Defence, the Ministry of Finance, and often the Prime Minister and Parliament must approve all large procurements. The lack of this trainer is costly in several ways. Without such an aircraft it takes longer to train pilots, and without it the pilots are not trained as well as they should be for modern aircraft, perhaps contributing to the high accident rate in the IAF.[5]

Advanced jet trainers (AJTs) are expensive, particularly in light of the quantities the IAF feels it needs for its current force size. Civilians have refused to act on such a big buy. Retired Air Marshal S. Raghavendran has suggested that, given the urgency of the requirement, the IAF should lease trainers for the short term at least, perhaps with an option to buy later. He has also advocated an even cheaper option—to arrange to send a number of pilots abroad for training.[6] This option has certain advantages (modern trainers, ex-

[3]Some simulators are being used in this training, but it is not clear how many or how sophisticated they are. The Mirage 2000 based at Gwalior is reported to have the most sophisticated simulators.

[4]The air force has opted for either the British Hawk or the German-French Alpha Jet, but the civilians have yet to decide.

[5]Birds are also a serious cause of accidents because of the low-level tactics of the IAF, as well as those of the PAF. See Air Chief Marshal Wollen interview in *Indian Aviation: Civil and Military*, Vol. VII, No. 27, p. 9.

[6]Discussion of senior author with Air Marshal S. Raghavendran, New York City, October 1993.

perienced instructors, and exposure to other air forces). It would, however, be difficult for the IAF to act counter to India's policy of self-reliance. There is no known reaction from the IAF to these suggestions.

There is genuine concern about training in the air force, although not widely admitted.[7] The reportedly high accident rate of the Indian Air Force is partially blamed on inadequate training. There are also concerns that too few technicians are being trained, and maintenance suffers. A shortage of the latter could also contribute to the accident rate, especially with the aging fighter fleet. Pilot training suffers also from curtailed flying time in flying units, owing to the shortage of spares, available aircraft, and money.

While air force leaders have said they are doing all they can to improve training, the recent report by the Comptroller and Auditor General of India suggests that, as of 1992, the training program was not working very well. The report indicates that a long-term training plan (LTTP) had been approved by the Ministry of Defence for January 1977 to December 1986 and "prescribed intake of trainees from the services, duration of courses, flying hours to be done, and number of aircraft authorized for such training."[8] The plan's implementation did not appear to have gone too well, because in August 1982 a high-level committee on flight safety was appointed by the Ministry of Defence to make an in-depth study "into the accident pattern and entire training process with a view toward identifying the areas of weakness in the system and suggesting methods to reduce the accident rate."[9] The committee concluded that "the overall training process was not effective" and recommended ways to im-

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[7]Air Marshal (retired) M. S. D. Wollen in *Indian Aviation: Civil and Military*, Vol. VII, No. 27, p. 14, says there is a "lacuna in present day training of pilots." C. V. Gole, "On the IAF's Diamond Jubilee . . . Whither the Indian Air Force?" *Vayu Aerospace Review*, V/1992, writes that the air force is sparing no efforts to keep up with the quality of training but states it needs modern training aircraft and aids (p. 32). He also states (p. 30) that authorized maintenance reserves (MR) are not adequate to beef up authorized strength of squadrons. See also Shekhar Gupta with W. P. S. Sidhu and Kanwar Sandhu, "A Middle-Aged Military Machine," *India Today*, April 30, 1993, pp. 39–40. Top air force officers claim morale is high, training is good, and accidents are within acceptable limits. See the CAG report, op. cit., pp. 8–19.

[8]CAG report, p. 8.

[9]Ibid., p. 8.

prove the training.[10] The Ministry accepted these suggestions, which were known as the Interim Training Plan for Pilots (ITPP) for the period 1983–1986. In June 1984, Air Headquarters proposed to undertake a new LTTP. That has not yet been finalized. The ITPP has been extended to December 1994—ten years after the LTTP was initiated. The report goes on to make the following points:

- The small intake of pilot candidates and high wastage rates continue to reduce numbers of pilots trained per year. Plans for making up the deficiency in pilots have not yet been finalized.
- Low availability of trainer aircraft for all stages of training has slowed training and made it less effective.
- A shortage of qualified technical manpower had "necessitated the overtaxing and overloading of the available staff and affected timely completion of the courses."[11]
- Training aids are out of date.
- Nonestablishment of a training range in the area of three main Flight Training Establishments (FTEs) led to greater expense in training.
- The serviceability of aircraft has remained low; unserviceability rates reached 24–48 percent at different training bases.
- The incidence of aircraft losses in training has been high; from 1987 to 1991, more than half the losses were due to pilot error.
- There has been a shortage of instructors.[12]

One detects in the report no sense of urgency or determination to improve the training program. Some of these problems have existed for a long time, raising doubt about the quality and preparedness of the air force, at least from a training perspective.

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[10]Ibid., p. 8.

[11]Ibid., p. 17.

[12]Ibid., pp. 8–10.

## MAINTENANCE

The IAF created one other functional command, the Maintenance Command. Its headquarters is located at Nagpur, but it has its own maintenance and repair facilities and depots spread around the country, and its personnel serve on all operating bases. As with the Training Command, the Mainenance Command appears to have suffered from neglect. Less glamorous than the Training Command, the Maintenance Command receives little attention—an unfortunate condition, because it is absolutely essential to the successful operation of the combat, transport, and helicopter fleets. Given the aging fleets and shortage of spares, the command becomes even more important and faces an enormous challenge.

Not much information is available about this command. Some insights on maintenance in general in the air force can be gleaned from public sources and from discussions with retired IAF personnel.

It would be surprising if there was *not* a shortage of technical maintenance personnel: The CAG indicates that the low serviceability rates in both the Training Command and combat units resulted from nonavailability of repair technicians and overloaded facilities.

Whether the IAF failed to support maintenance or the Maintenance Command did not do its job properly is not clear. In one case, a new aircraft was procured in 1986, and the first engine overhaul was expected in 1989. However, repair facilities had neither been constructed by that time nor were available in 1992.[13] In June 1992, IAF headquarters stated that a contract for construction of facilities had been signed in August 1991, and construction was scheduled for completion in 1994.

In another case, construction of a central depot for the ADGES experienced similarly long delays. The Defence Committee of the Cabinet in September 1970 approved the establishment of the depot, called the Air Defence Ground Environment System Maintenance Standards Establishment, which was initially to be completed by 1974. However, not until June 1978 was a Board of Officers set up to assess the depot's requirements. The delay, according to the report,

[13]Ibid., p. 33.

"was essentially attributable to poor planning and inadequate administrative control."[14] The Ministry of Defence contributed to such delays by its slow—in fact, too late—concurrences for work execution. The delay has been costly and has entailed long turnaround times for the field units' equipment.

Although these two cases may be the exception, they may also exemplify delays and inefficiencies in the maintenance system. Air Headquarters appears largely to blame for the delays in both cases, with the Ministry of Defence also contributing. Maintenance Command's role and responsibility are not identified in the CAG report.

In this time of shortages of spares and other equipment, and old aircraft, the Maintenance Command faces a tremendous challenge. We do not know its current status, although the CAG suggests that not all is well. However, Indians have shown imagination and ingenuity in the past in adapting aircraft to IAF needs and in keeping aircraft flying.

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[14] Ibid., p. 54.

Chapter Six

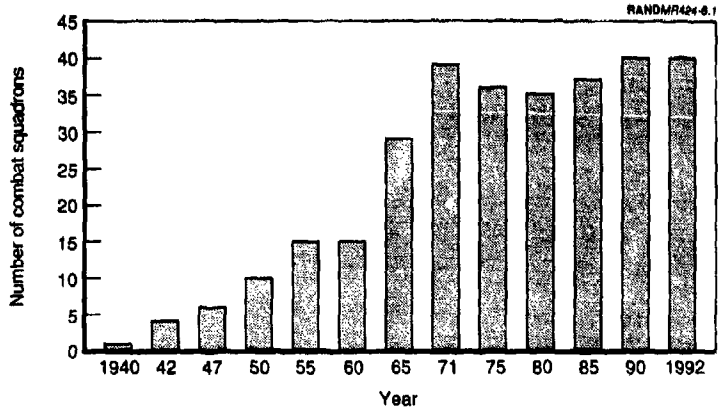
# IAF FORCE STRUCTURE TRENDS

Figure 6.1 provides a brief overview of general trends in the size of the IAF. The growth and development of the IAF have been heavily influenced by the actions and capabilities of two of India's close neighbors, Pakistan and China.

Continued tension with Pakistan in the early 1950s led to the first major Indian increase in the size of its air force to an approved level of 15 squadrons. The next external event that jolted India was the Chinese attack in 1962, which led to an immediate and major increase in the size of the Indian Air Force and Army. An approved level of 45 squadrons was obtained for the air force.[1] While this extensive buildup was under way, the 1965 war with Pakistan added some urgency to the buildup. The 1971 war with Pakistan revealed a more effective and improved IAF. It has remained at roughly these force levels to the present day.

A second factor affecting IAF growth—and its ability to maintain the expanded force structure achieved in the mid-1960s for the last several decades—has been India's desire for preeminent status and a greater role in regional affairs and, for some Indians at least, in global affairs. The push for a blue-water navy in the 1980s, while based on legitimate concern over India's maritime interests, also reflected India's desire for greater recognition as a world power. Its "peaceful

[1] K. Subramanyam told the senior author in February 1994 in New Delhi that the actual level approved was 64 squadrons. The IAF began to recruit and train pilots for this increased size; however, when the additional squadrons were not approved, the IAF had an excess of pilots for a while.




SOURCES: International Institute for Strategic Studies, *The Military Balance*, 1964–1993; Victor Flintham, *Air Wars and Aircraft*, New York: Facts on File, 1990; "Indian Air Power," *World Airpower Journal*, London: Aerospace Publishing Ltd., 1993. Note that the numbers of squadrons indicated on this figure are approximate, reflecting the authors' reconciliation of the considerable variation among estimates in the literature and among regional experts. Air Chief Marshal Suri used the figure of 39 squadrons in discussions with the senior author in New Delhi in February 1993.

**Figure 6.1—Growth of Air Force (Combat Squadrons)**

nuclear explosion" (PNE) in 1974 had similar implications. India's development of the intermediate-range ballistic missile (IRBM) Agni and the acquisition of strategic troop airlift capabilities also suggest a wider horizon for Indian defense thinking.

The third factor is the operational requirements of the air force. A *Perspective Plan* lays out long-range (25 years) plans. The only one, apparently done in 1975, is updated and expanded every five years. Neither the contents of these plans nor the degree of their implementation is known to the public. In any case, in the Indian defense structure, the Ministries of Defence and Finance make the final decisions on all procurement, so the air force can only request and argue the case. Furthermore, financial considerations always offset these decisions—especially now.

A fourth factor is the role of civilians in military affairs. One group, the politicians, holds the few top posts in the Ministry of Defence; the civilian bureaucrats play a key role, often eclipsing that of the politicians, who have different priorities. In fact, the bureaucrats' advice to the Minister is often the decisive factor in the top-level decisions. The military accepts civilian control by the elected polilticians but are resentful of the bureaucrats, who are often uninformed in military matters and are rotated frequently. The day-to-day interactions with the bureaucrats often aggravate tensions, with the bureaucrats usually having the last word.[2] This is not to say that there are no talented and informed bureaucrats who work well with the military, but friction exists in the Ministry of Defence (MOD).

The IAF's major responsibility in the hardware procurement process is to formulate its requirements and to prepare a list of suitable alternatives. If the civilian authority elects to satisfy those requirements through indigenous production, the Defence Research and Development Organization (DRDO) and the appropriate "public-sector enterprise" (e.g., HAL) design, test, and if approved by the MOD, produce the item (aircraft, engine, etc.). The IAF has very little say in the process and, on several occasions, has had to accept aircraft or systems with considerably less capability than it desired. Historically, indigenous aircraft development and production have been inefficient and costly, and aircraft have seldom met IAF requirements. This policy has not always been pleasing to the military because they often have not been able to acquire the most sophisticated and modern equipment, although all have supported efforts to improve India's industrial military capabilities.

Another civilian influence has been the preference for defensive weapons, such as air defense aircraft. The air force has found it easier to justify and persuade civilians of a need for air defense aircraft and transports than for other types of aircraft. For example, the acquisition of the Mirage 2000 was justified on the basis of its air defense capabilities, and as a counter to Pakistan's F-16s, although it is really a dual-purpose aircraft with important attack capabilities. Civilians reportedly have also been somewhat reluctant, for reasons

[2]A former Chief cited instances of bureaucrats' overruling the air force's promotion recommendations because of favoritism in the bureaucracy. Discussion with senior author in New Delhi, February 1994.

not entirely clear, to provide for modern electronic equipment and force multipliers that are critical to the functioning of any modern air force. For its part, the air force appears not to have fought hard for such equipment and has opted for more aircraft instead.

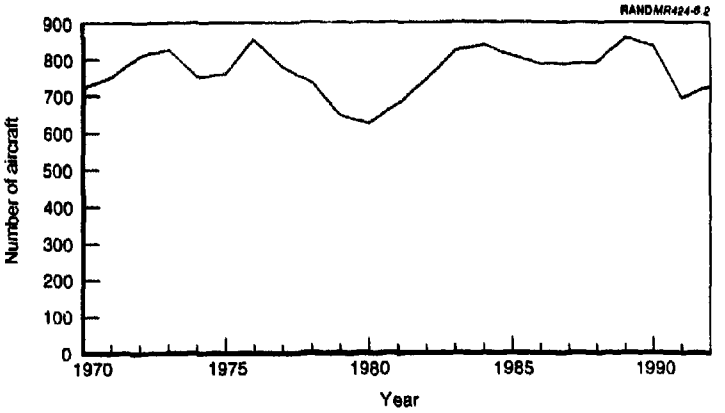
Politics have played a great role in procurement. Modern combat aircraft are extremely expensive, and foreign purchases are subject to considerable interest. Politicians have often been accused of taking bribes and deciding on the basis of those bribes what to procure. Such allegations, for example, continue to surround the procurement of the Mirage 2000 in the early 1980s. Some Indians claim that the unresolved scandal of Bofors guns hangs heavy in India and has delayed the procurement of major systems, in particular the much-needed advanced jet trainer, which would be a huge purchase with considerable possibilities for corruption.

Finally, since the mid-1960s the Soviet Union's offers of aircraft on good terms have led the IAF to turn to the Soviet Union. As a result, 80 percent of the IAF is now composed of Soviet-made aircraft. One former Chief went as far as to say that the IAF just grew the way it did because of this factor. This statement may be an exaggeration, but little doubt exists that the availability and low cost of these aircraft on favorable terms influenced the IAF procurement process enormously.

## FORCE STRUCTURE TRENDS IN THE IAF, 1970–1992

Following the conflict with Pakistan in 1971, the IAF grew to approximately 40 squadrons of combat aircraft. As illustrated in Figure 6.2, the number of aircraft in the IAF's fighter force has proved remarkably stable since then, averaging roughly 750 fighters in terms of total inventory since 1970. The number of aircraft actually available for combat operations, of course, would be smaller.

The acquisition of Canberras, Mystères, and Hunters had begun in the 1950s; by the early 1970s, India's ground attack fleet was becoming increasingly obsolete. The Indians were hopeful that the HF-24 Marut, India's first indigenously designed and produced fighter, would replace the Mystères and Hunters. But the program, which began in 1956, proved to be a serious disappointment. It had taken more than a decade to develop, had encountered substantial cost




SOURCE: International Institute for Strategic Studies, *The Military Balance*, 1970–1993. The force reduction shown in the late 1970s and early 1980s is apparently a result of the modernization plans launched in those time periods—in particular, the retirement of Mystères and Gnats, and the subsequent entry into the force of MiG-23 and Jaguar aircraft. Some of the other fluctuations in number may in fact represent changes in counting rules employed by the International Institute for Strategic Studies.

**Figure 6.2—IAF Fighter Force**

overruns, and was beset by many other problems. Principally, it was underpowered: an appropriate engine was never acquired. It has been suggested that the Marut should have been powered by two British Bristol Orpheus engines of 3700 kilograms of thrust each. Instead, its engines had only 2200 kilograms of thrust each. For a time, there were hopes for a more successful, improved variant. Efforts to replace the engines were unsuccessful, and the upgrade program was abandoned by the mid-1970s; however, more than 100 of the aircraft were produced and entered service in the IAF.[3] As an interim measure, 100 Soviet Su-7s were acquired for the ground attack role, but because of limited payload capability and maneuverability, these proved not to be as useful as was hoped either.

[3]The IAF abandoned these in 1983.

Thus, by the end of the 1970s, the ground attack fleet was clearly old (Canberras and Hunters) or operationally inadequate (Maruts and Su-7s). The exception was a ground attack version of the MiG-21—the "M" variant—but this aircraft possessed a limited range and payload for ground attack operations. The air defense fleet also relied heavily on the MiG-21F/FL/bis (Figure 6.3) to meet the nation's air defense needs.

The aircraft procured in the 1960s thus formed the core of the force throughout the 1970s, as shown in Figure 6.4. But by the end of that decade, the MiG-21s continued to be India's most modern fighters. As illustrated in Figure 6.4, the IAF embarked on an ambitious modernization scheme in the 1980s by acquiring no less than *six* new types of aircraft, plus the Ajeet (an Indian ground attack version of the venerable Gnat). Jaguars, MiG-23s, MiG-27s, and Ajeets (Figures 6.5 through 6.7) entered the force in the early 1980s and, along with the older MiG-21Ms, constituted the ground attack force. In the air defense role, the Gnat was retired. To the MiG-21Ms variant acquired in the mid-1970s, the IAF added the Mirage 2000 from 1983 to

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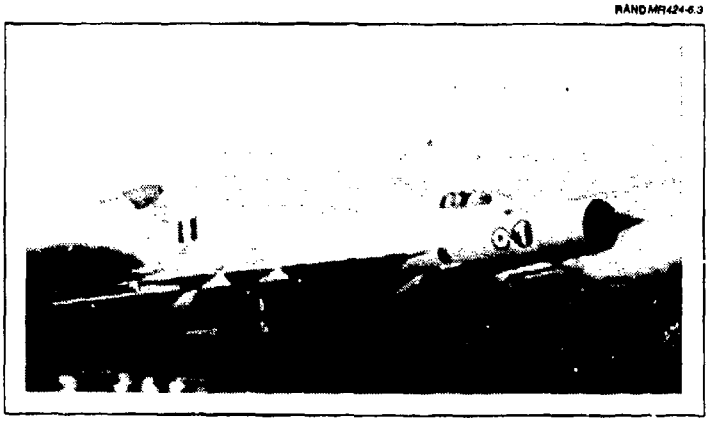
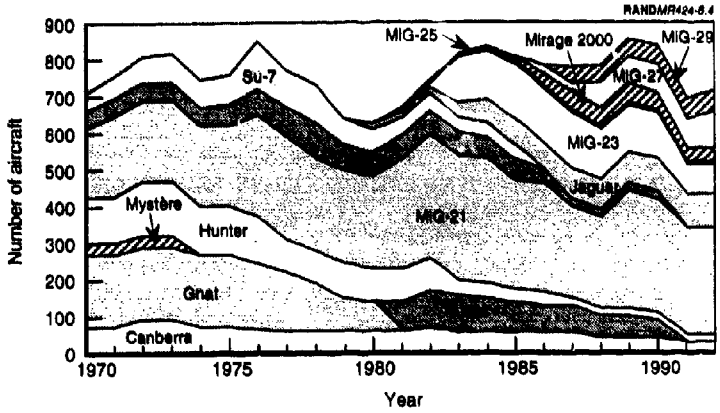


**Figure 6.3—MiG-21bis. The fleet of Soviet-designed MiG-21bis fighters, the mainstay of the IAF, was first acquired by the IAF in 1976 and is scheduled to be upgraded with advanced avionics.**




SOURCE: International Institute for Strategic Studies, *The Military Balance*, 1970–1993.

**Figure 6.4—The Evolution of the IAF's Combat Force, 1970–1992**


**Figure 6.5—Jaguar. Designed and developed by France and the United Kingdom, the Sepecat Jaguar has filled the IAF requirement for DPSA since 1979.**

Figure 6.6—MiG-23. Soviet MiG-23MF air defense fighters were introduced into the IAF in 1983; other MiG-23 variants served in the ground attack role.

Figure 6.7—HAL Ajeet. An upgraded Indian-built version of the British Gnat, the HAL Ajeet ground attack aircraft was introduced into the IAF in the late 1970s and retired in the early 1990s.

1988 and the MiG-29 from 1986 to 1987. These important acquisitions are detailed next.

## AIR DEFENSE MODERNIZATION

From 1981 to 1982, India turned to the West for an advanced technology interceptor. In 1982, a contract was signed with France for the Mirage 2000 delta-wing, fly-by-wire fighter (Figure 6.8).[4] At the time, the sale was very important to Dassault because of the competition posed by the cheaper (and perhaps more advanced) F-16. The initial Indian purchase of 40 aircraft was delivered in 1984. Some analysts argue that the resulting two-squadron force of Mirage 2000s is too small and has been too expensive to maintain, and that additional squadrons could take better advantage of existing infra-



**Figure 6.8—Mirage 2000. Two squadrons of the French Mirage 2000H multirole fighter were acquired in 1984 and serve primarily as part of the IAF's air defense fleet.**

[4] Ravi Rikhye, in *The Militarization of Mother India*, New Delhi: Chanakya Publications, 1990, pp. 49–50, asserts that India had already purchased the Mirage 2000 when Pakistan signed for the F-16.

structure.[5] To follow up the initial purchase, Dassault offered to permit HAL to locally produce 110 aircraft. Cost was an obstacle, however, and the project was dropped in 1984 in favor of cheaper Soviet aircraft. Initial disappointment with the aircraft's performance may also have been a factor.[6] Most air force officers think highly of the aircraft, and the Indian Air Staff reportedly wants to increase its force of Mirage 2000s, although the fighter is extremely expensive both in acquisition cost and in annual operation and support.[7]

The small number of Mirage 2000s still left a gaping void in the IAF's aging air defense fleet—the air force's highest priority mission. Accordingly, the IAF made arrangements to procure the MiG-29 Fulcrum, locally known as the Baaz (Falcon) (Figure 6.9). This aircraft, the newest combat aircraft in the IAF inventory, is an air superiority fighter.[8] India placed the first export order for MiG-29s even before the fighter had attained operational status with the former Soviet air force, a move that reflected the close cooperation between the two nations. Delivery of the aircraft, however, was delayed by India's refusal to accept *sanitized* aircraft, with older avionics and weapons, similar to the 80 supplied to the Syrian Air Force. The IAF aircraft are thus reportedly equipped with the same radar and avionics as those supplied to the Soviet Frontal Aviation. India began receiving the first MiG-29s in late 1986. By 1987, two squadrons were operational. A third squadron was received in 1989, and a recent report indicates that India may conclude a deal to receive a fourth squadron (20 aircraft) of MiG-29 aircraft from Russia.[9] The Indians also have discussed joint production of the MiG-29

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[5]See, for example, Rikhye, pp. 50–51.

[6]"Indian Air Power," *World Airpower Journal*, London: Aerospace Publishing Ltd., 1993, p. 144. The disappointment was not so much with the aircraft as with its delayed integration with air-to-air and air-to-ground missiles. This problem was remedied in a few years.

[7]According to Rikhye, the Mirage 2000 cost Rs 42.5 crores per unit, "without the promised engine and radar, and without weapons." The F-16s purchased by Pakistan, on the other hand, cost Rs 30 crores per unit, complete. Moreover, French spares are apparently particularly expensive. Op. cit., pp. 60–61.

[8]Newer versions reportedly have a ground attack capability.

[9]Pravin Sawhney, "Air Force to Receive 20 MiG-29s from Russia," *Indian Express*, November 24, 1992, p. 1. Reported in *Foreign Broadcast Information Service (FBIS)*,

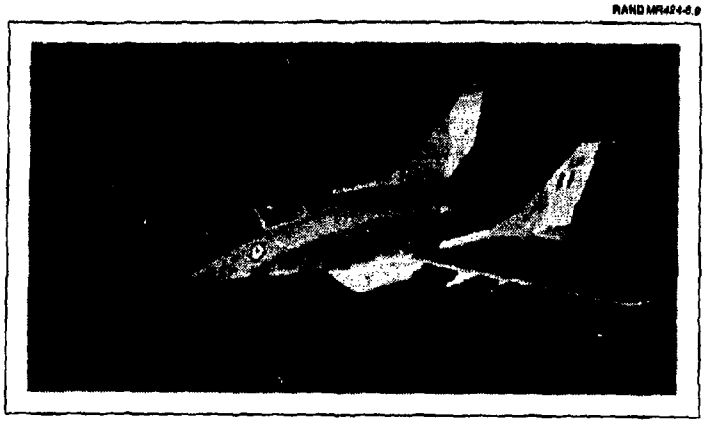

**Figure 6.9—MiG-29. An advanced multirole fighter, the MiG-29B was acquired from the former Soviet Union in 1986 and is used primarily in the air defense role.**

and have apparently already agreed on a MiG-29 aircraft overhaul unit in India, although the future of the MiG-29 is in some doubt in Russia. The exact state of affairs is not entirely clear as of this writing.

The air force has stated that the MiG-29 is one of their top three aircraft. However, again according to the CAG report, the IAF has experienced a number of unexpected problems with this aircraft.[10] The CAG looked into the acquisition of the MiG-29 and concluded that

December 1, 1992, p. 59, and in *Armed Forces Journal International*, May 1993, p. 16. However, financial considerations may preclude this buy, and the government has made no announcement of such a purchase. The Indian government has announced that it would purchase 30 MiG-29s if the United States releases the F-16s now withheld from Pakistan under the Pressler Amendment. Pakistan, however, has stated that it will not cap its nuclear program to gain release of the F-16s.

[10]Although the report does not state that the aircraft it is discussing is the MiG-29, the dates of induction of the MiG-29 into the IAF and other characteristics suggested to the author that the aircraft *is* the MiG-29. This view is shared by Sanjeen Verma and A. Thothathari, "Special Report: Indian Air Force into a Tailspin," *Business India*, September 13–26, 1993, p. 92.

the MiG-29 fleet "had been giving extensive problems in operation and maintenance since its induction, mainly due to the large number of premature failures of the engines, components and systems. Of the total 188 engines available in the fleet, 139 engines failed prematurely and been withdrawn by July 1992."[11] Further analysis indicated that 62 of the 139 engines were withdrawn prematurely before 50 percent of the prescribed overhaul life of 300 hours had been completed.

Nonavailability of radar components also resulted in the grounding of seven aircraft from 6 to 20 months. In March 1991, Air Headquarters indicated that "due to non-availability of repair/overhaul facilities and lack of product support," fleet availability was reduced by 15–20 percent during the previous three years. Serviceability declined steadily, as the following tabulation indicates.

| | Serviceability | | Aircraft on Ground | |
|---|---|---|---|---|
| Year | Fighter | Trainer | Fighter | Trainer |
| 1987 | 76.71 | 84.00 | 0.76 | 1.50 |
| 1988 | 71.34 | 74.30 | 7.59 | 2.29 |
| 1989 | 57.33 | 64.00 | 19.18 | 6.82 |
| 1990 | 64.00 | 47.00 | 20.50 | 43.00 |

SOURCE: CAG report, p. 32.

Although the air force knew the schedule for the engines' overhaul, it had not constructed the facilities to do this job in India in time. In fact, the overhaul facilities are not expected to be completed until the end of 1994, four or five years after the first overhaul was due to take place. This failure to establish proper repair facilities forced the air force to send the engines back to Russia for overhaul, which used up large amounts of foreign exchange and greatly lengthened the period during which the aircraft were not available. Furthermore, the data-processing unit, a costly import, has been lying unused since it was received in August 1990.

These problems have seriously reduced the availability of one of India's most modern aircraft. They are particularly significant be-

[11] *Report of the Comptroller and Auditor General of India for the Year Ended 31 March 1992, No. 9 of 1993*, Union Government, 1993, p. 32.

cause older aircraft are becoming less and less available. Why the air force failed to build the required repair facilities is not explained. The report does not state whether the failure to construct these facilities was due to inadequate funds or to a poor decision on the part of the top leadership of the air force.[12]

## GROUND ATTACK MODERNIZATION

The 1971 war made it clear that Canberra medium bombers and Hunter fighter-bombers were too vulnerable to modern air defense systems and would be of limited utility in the future.[13] Recognizing the need for a new generation of interdiction and strike aircraft, the IAF generated a requirement for the Deep Penetration Strike Aircraft (DPSA) as early as 1967 and began evaluating potential aircraft. The Anglo-French Jaguar emerged as the aircraft of choice by 1978. Designed and developed by British Aerospace and Dassault in the 1960s, this fairly advanced, medium attack aircraft was purchased in small numbers starting in 1979 and then manufactured under license in India in collaboration with British Aerospace. The 116 aircraft form the elite long-range striking arm of the IAF. By the mid-1980s, the Jaguar was in service in five squadrons, one equipped with anti-shipping missiles to support fleet operations.

In addition, the MiG-23BN ground attack variant, with nearly double the payload of the types it replaced (Su-7s and Maruts), was also acquired in the early 1980s (Figure 6.10). It is being complemented by the license-built MiG-27Ms, a ground attack export variant of the basic MiG-23 family. Plans for the licensed production of the latter were announced in 1982. A total of 165 aircraft was initially planned, with the first reaching operational squadrons in 1986. Finally, a handful of MiG-25 reconnaissance aircraft (six single-seat aircraft and two 2-seat trainers) were procured in the 1980s (Figure 6.11).

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[12]This paragraph is based on the CAG report, pp. 31–35. We have found no air force reply to these serious allegations concerning the MiG-29.

[13]C. V. Gole, in "On the IAF's Diamond Jubilee . . . Whither the Indian Air Force?" op. cit., p. 36, writes of the "disastrous loss" of strike aircraft in 1965 and the "good beating" the Hunter got in 1971.

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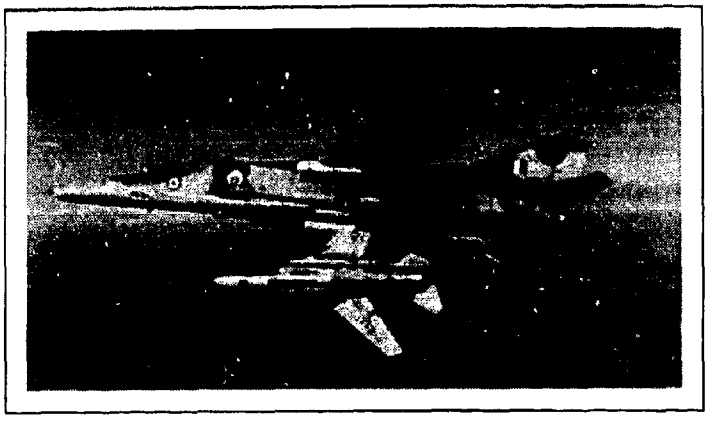

**Figure 6.10—MiG-23BN. An optimized variant of the MiG-23BN ground attack fighter, the Soviet MiG-27ML has been license-produced in India and began its service in the IAF in 1986.**

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**Figure 6.11—MiG-25. Six Soviet MiG-25Rs, ordered in 1980, are used in strategic reconnaissance and targeting.**

## SOME OBSERVATIONS

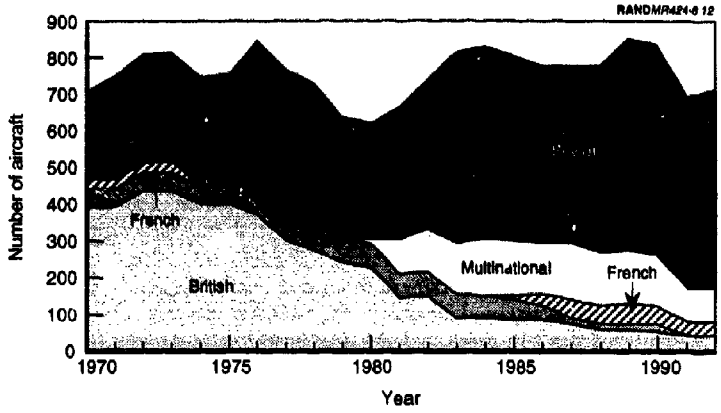
In reviewing the IAF's procurement history, we noted that several characteristics stand out.

### Multiplicity of Aircraft Types

The IAF—both today and historically—has possessed a wide variety of aircraft. This strategy partially reflects the reactive process by which the IAF developed its force in the 1960s but does not fully explain the continuing diversity of the force. For example, from 1970 to 1974, the IAF possessed seven types of fighter aircraft. With the retirement of the Mystères in 1974, this number was reduced later to six different types. By the late 1980s, about 11 different fighters were in use in the IAF. By the early 1990s there were nine—still a considerable number—when Ajeets and Hunters were retired from the force. The large number of aircraft types in the IAF created inevitable management, maintenance, organizational structure, training, and budget problems—problems still facing the IAF today and that, as we shall see, pose complications in forming a coherent modernization strategy for the future.

### Diversification of Supply

India's desires to diversify its sources of combat aircraft played a crucial role in this development during the 1980s. A consistent historical objective of Indian policy has been to diversify the suppliers of combat aircraft to mitigate the effects of arms embargos and political pressures on India's independence. However, there has been a heavy dependence on the former Soviet Union for aircraft as the availability of good, inexpensive Soviet aircraft, offered on very favorable financial terms, and with licensing agreements, led the IAF to procure mostly Soviet aircraft (Figure 6.12). These aircraft have served the Indians well. The aircraft did not always meet all the IAF operational requirements, but the Indians modified many of the aircraft to suit their needs.




SOURCE: International Institute for Strategic Studies, *The Military Balance*, 1970–1993. Note that aircraft indicated as "multinational" include the British-French Jaguars and the Ajeet, the Indian version of the British Gnat. Thus, the decline in British-designed aircraft is not quite as sharp as the figures may appear to suggest.

**Figure 6.12—IAF Fighter Design Origins**

## Indigenous Production

Another key trend in the development of the IAF's force structure was the consistent desire to emphasize indigenous production to build India's economic and industrial base and also to maintain the policy of independence. India's HAL, located at Bangalore, has built more than 2400 aircraft of different types, including 12 designed indigenously. Most combat aircraft have been produced through collaboration and acquisition of military technology from the former Soviet Union, Britain, France, Germany, and, to a much lesser extent, the United States. About half the current IAF fleet of combat aircraft, including all MiG-27s, most MiG-21s, and many Jaguars, were built in India. Indigenous production acquired a new level of importance in Indian strategic planning in the mid-1950s, with the design and development of the Marut HF-24.

While indigenous production proved worthwhile in some cases, its benefits were not always evident; in some instances, the consequences were clearly negative. For example, the essential failure of the Marut program, as described above, had ramifications for the force beyond the disappointment generated by the aircraft's performance and continuous cost overruns. Because of the continuous delays in that program, more than 100 Su-7 ground attack aircraft were added to the force as an interim measure. The Su-7s proved not to be a useful long-term addition to the force because of their limited payload, poor maneuverability, and high rate of loss during wartime. Ajeets, modified versions of the old Gnat design, with limited capabilities, were also produced to perform the ground attack role, but they served in the fleet for less than ten years. When the Marut's upgrade program was finally cancelled, the MiG-23BN was selected to replace the Maruts and Su-7s. The MiG-23BNs, in turn, would shortly thereafter be supplemented by MiG-27s. Thus, the program that served in many ways as the centerpiece of Indian aspirations to move toward self-sufficiency in the supply of combat aircraft to its air force both failed to meet performance expectations and, by keeping hope alive for extended periods, probably prevented the formulation of a more coherent long-term procurement strategy. This failure appears to have contributed considerably to the proliferation of aircraft types in the 1980s.

Recent statements concerning the Light Combat Aircraft (LCA) development suggest that emphasis on Indianization and self-reliance may be lessening. Dr. A. P. J. Kalam, head of the Defence Research and Development Organization, announced after the AVIA Air Show at Bangalore in 1993 that India was looking for international partners for its LCA program.[14] Indian leaders are recognizing that one nation cannot bear alone the technical complexities and enormous expenses of modern aircraft and other major military systems. He mentioned that even the United States did not make every part for its aircraft. It is also recognized that, to support a viable production system, India must seek foreign markets for its weapon systems. While this recognition is being discussed, India will likely continue to produce as many of its weapon systems as it can. The real necessity is to find suitable partners and foreign buyers, which of course,

[14] *India Today*, January 11, 1994, p. 66.

forces the production system to depend on foreigners, a dependence that India heretofore has sought to avoid.

## The Soviet Union as Principal Supplier

The policy emphasis on diversification of supply and on indigenous production was crucial in making Soviet aircraft more attractive to India, since the former Soviet Union agreed to license-built production on very favorable economic terms in the 1960s as well as to modifications to certain aircraft (notably the MiG-21). During that same time period, some Western nations were resistant to licensed-production deals or offered them on politically unacceptable terms.

By turning to the Soviet Union in the early 1960s in an effort to diversify its source of arms supply, India was strengthened in its dealings on arms with both the Soviet Union and the West. The competition for India's arms purchases led the Soviets to accept payment in Indian rupees, rather than a hard currency, and to offer low prices and interest rates, as well as long repayment periods. Barter arrangements also made the acquisition much more attractive. Moreover, since Moscow was not the exclusive supplier of arms to India, it could not wield undue influence over India. In the mid- to late 1980s, India enjoyed a healthy trade surplus with the Soviet Union.[15] Western arms suppliers, forced by India's purchases from the Soviets, offered similar terms, as reflected in recent agreements for licensed production of the Jaguar and an effort for licensed production of the Mirage 2000. The Soviet's willingness to permit licensed production in India has helped to develop India's nascent aerospace capabilities.

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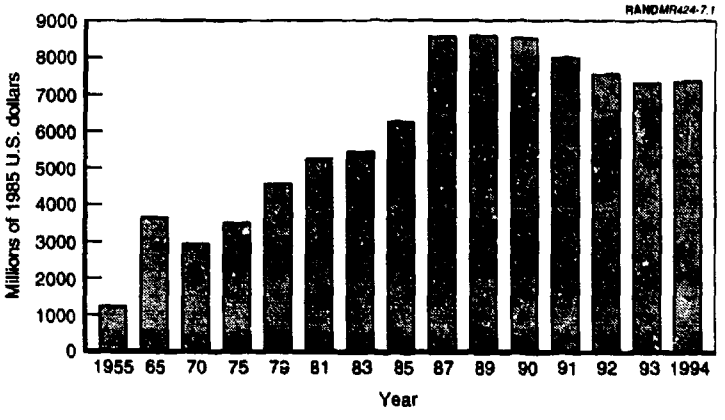
[15]See, for example, Pushpindar Singh, "The Indian Air Force: Modern and Professional," *Asian Defence Journal*, September 1987, pp. 22–23.

Chapter Seven

# THE IAF TODAY AND PROSPECTS FOR THE FUTURE

As shown in Figure 7.1, Indian military expenditures increased substantially in the 1980s, peaking from 1987 through about 1990. In the middle of that decade, India enjoyed relative economic success, characterized by low inflation, increases by more than 5 percent in the gross national product (GNP), and a high rate of industrial




SOURCE: International Institute for Strategic Studies, *The Military Balance*, 1987–1988, 1992–1993, and update from recent budgets.

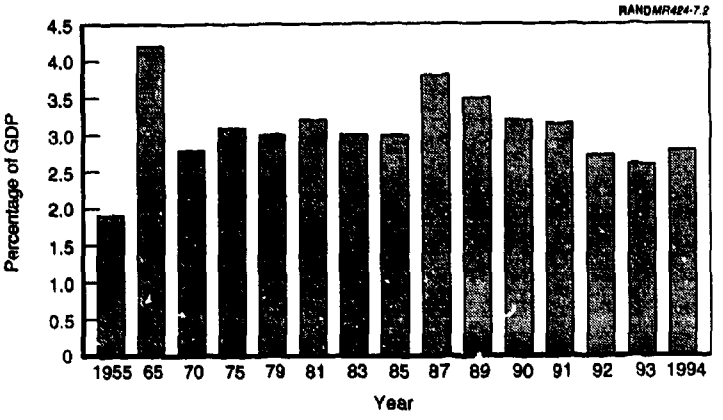
**Figure 7.1—Indian Military Expenditures, 1955–1994**

growth. That brief period has been referred to as "India's economic miracle."[1]

The increase in defense expenditures took place without greatly increasing the strain on the economy, as shown in Figure 7.2 (because of the steady increase in the Indian gross domestic product [GDP] during the 1980s).

As shown in Figure 7.3, the IAF's share of the increasing budget remained fairly steady over this period so that the IAF could conduct its substantial spending program on new systems.

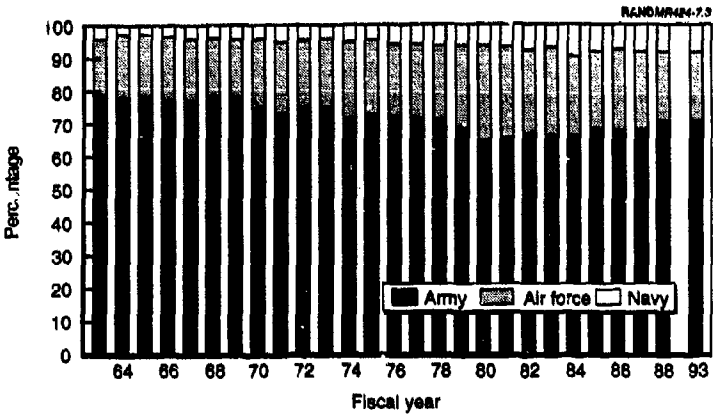
That was the 1980s. By the end of the decade, however, a severe budget crisis developed and the international lending agencies said that India must reduce its defense spending even though it was less




SOURCE: International Institute for Strategic Studies, *The Military Balance*, 1987–1988, 1992–1993, and update from recent budgets.

**Figure 7.2—The Military Burden: Military Expenditures as a Percentage of GDP**

[1]The International Institute for Strategic Studies, *Strategic Survey*, 1993–1994, London: Brassey's, 1993, p. 226.




SOURCE: Y. Lakshmi, *Trends in India's Defence Expenditure*, New Delhi: ABC Publishing House, 1989, pp. 147–148, and update from recent budget. The services shown here have not changed appreciably in the past ten years, although the air force is up a bit in 1994.

**Figure 7.3—Service Shares of Defense Expenditure**

than 4 percent of GDP. It is down now to about 2.5 percent. Last year (FY 1992–1993), India's defense budget increased by 7 percent but fell in real terms, given the country's 12 percent inflation and the devaluation of the rupee.[2] The defense budget for FY 1993–1994 increased by 9.6 percent. Given the current rate of inflation at 7 percent, that represents a real increase of about 2 percent. The 1994–1995 defense budget increased 20 percent, but inflation reduced that by 8–9 percent. This year the air force is exhibiting a trend for procurement.

It is difficult to get a good fix on the Indian defense budget, especially as the Indian government does not want to increase it because pressure is being exerted by the World Bank and others to keep defense spending down. Also, missile development and any nuclear activities are not included. If the midterm increase of about 12 percent in

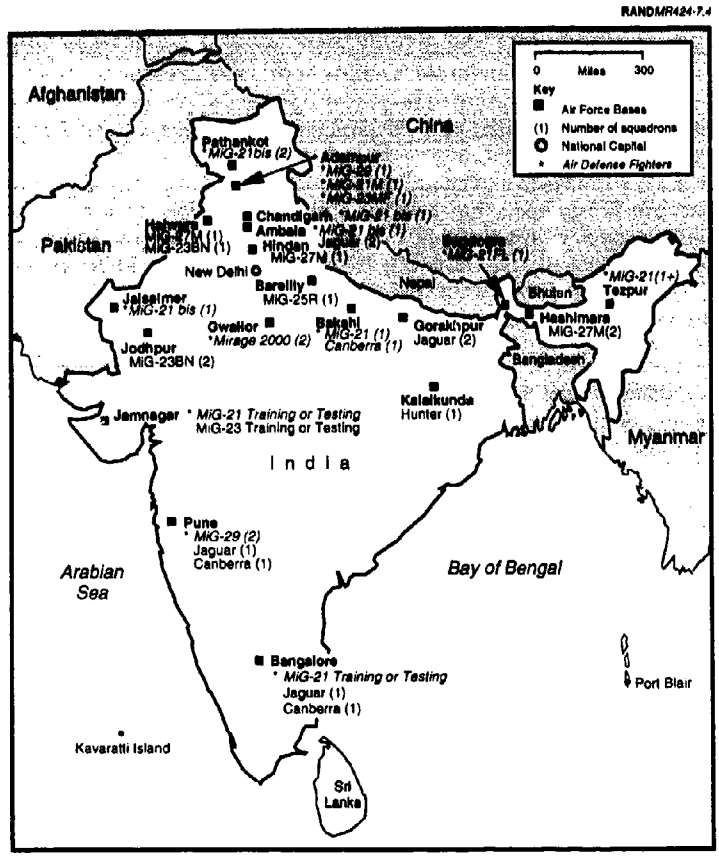
[2]"India Sets 5% Lower Budget," *Jane's Defence Weekly*, International Ed., Vol. 17, No. 12, March 21, 1992, p. 462.

the 1993–1994 budget is taken into account, the 20 percent increase when the 1994–1995 budget was announced is, in fact, only an 18 percent increase over actual expenditures for 1993–1994. However, there is talk of an add-on for the 1994–1995 budget also. The air force received a greater increase in its share of the defense budget relative to the other services, and so has funds for procurement. The recent IAF budgets have covered only operational and administrative expenses.

The IAF today has approximately 1400 aircraft of all types. The Training Command has a wide variety of training, combat, and transport aircraft. The important transport element is organized into 12 squadrons, although this number may be reduced to 10 with perhaps 175 transport aircraft. The helicopter fleet of transport and gun ships numbers another 175, organized in 13 squadrons, two of which are strictly gun ships. A small group of miscellaneous aircraft (approximately 40) is used to transport VIPs, as well as for reconnaissance and liaison. The state of readiness for all these aircraft is unknown.

As far as the air force is concerned, the key element is the combat aircraft for air defense and ground attack operations. In terms of total inventory, such aircraft number more than 700 and are organized in roughly 39 squadrons and deployed as shown in Figure 7.4.[3] Note the rough balance between air defense and ground attack aircraft of these squadrons. A heavy air force concentration of six air defense and six ground attack squadrons north of New Delhi reflects the ongoing concerns about Pakistan Three air defense and three ground attack squadrons are located south of Delhi, in the vicinity of Nepal. In the east, the IAF has deployed two air defense and two ground attack squadrons. About four ground attack and three air defense squadrons are located in the west and southwest, in the vicinity of South Pakistan. Aircraft deployed at Jamnagar, in the west, and at Bangalore, in the south, probably are used for training and testing. But IAF's combat capabilities have been seriously eroded by budgetary problems. IAF readiness statistics are difficult to determine as government officials are not permitted to talk about them.

[3]For example, Manoj Joshi in "Indian Air Force at the Crossroads," *Frontline*, October 23, 1992, pp. 59–60, claims that the IAF has 37 combat squadrons but writes of the shortage of pilots and spares, and of other problems confronting the air force.




SOURCE: "Indian Air Power," *World Airpower Journal*, 1993.

**Figure 7.4—Current IAF Combat Force Deployment**

Today about 60 percent of the IAF's fighters are of Soviet origin. With the disintegration of the Soviet Union, the future of this part of the force is highly uncertain. India has had considerable difficulty in acquiring new systems from the former Soviet Union, now the

Commonwealth of Independent States (CIS), and even spares for the systems it now owns. By October 1992, the shortage in spare parts and the long delays in the IAF's ability to get aircraft engines serviced had led to the grounding of large elements of its fighter force (some reports have stated that up to 50 percent of the force is non-mission-capable).[4] The CIS has announced that it no longer can provide military supplies in exchange for long-term credit or soft currency, as had previously been the case; hard currency is now required.[5] But India is faced with a shortage of hard currency. Moreover, India apparently has had great difficulty locating the roughly 3500 ex-Soviet arms suppliers now scattered throughout the CIS. Air Chief Kaul said in August 1993 that spares were his highest priority.[6]

The IAF claims that the Jaguars (four squadrons), Mirage 2000s (two squadrons), and MiG-29s (three squadrons) are relatively new and should be in good condition and ready for a war, although spares for MiG-29s may be scarce. However, as noted earlier with reference to the CAG report, the MiG-29 has had serious defects that reduced the number available for operation. The MiG-21s constitute about half the combat fleet, or about 17 squadrons. Several different versions of the MiG-21 exist. The FLs are just about finished, with the MiG-21Ms not far behind. The eight or nine squadrons of MiG-21bis could be extended, and plans to do so have been discussed in and outside of the air force.[7] The MiG-23 and MiG-27 can continue for a decade or so longer, but they are hardly modern systems, and their effectiveness remains unclear. The IAF has an old fleet; about three-fourths of the fighters should be replaced in the next few years but may not be replaced because of lack of funds.

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[4]Molly Moore, "India's Military Hit by Soviet Collapse," *The Washington Post*, October 4, 1992, p. 34.

[5]During the Cold War, India was able to purchase weapons through barter for tea and other goods, or on long-term loans at 2 percent interest. Ibid., p. 34. Prime Minister Rao's visit seems to have improved both Indo-Russian relations and India's ability to obtain spares and newer equipment from Russia. See also footnote 9 of this chapter for a description of improvements.

[6]*The Sunday Tribune* (Chandigarh), August 2, 1993.

[7]Air Marshal (retired) M. S. D. Wollen, "MiG-21 BIS Upgrade," *Indian Aviation*, October 23, 1992, p. 4.

The lack of spares is known to be critical and was not yet solved when an Air Marshal told the senior author in 1991 that unless spares were provided soon, not much of the IAF would be flying. That was three years ago, and now–Air Chief Marshal Kaul has stated often that the problem is not yet resolved. Even with the financial problems on the Indian side, the main reason appears to be that since the disintegration of the Soviet Union, various manufacturing facilities are spread about in newly independent nations. The Indian government has made repeated, unsuccessful efforts either to locate these production centers or, if located, to make arrangements for spares. Also, some of the factories no longer may be making the parts. This possibility is a particularly serious problem, because Soviet aircraft were not intended to last too long; for example, the engines for the MiG-21were built to last approximately 200 hours and then be replaced.[8] Even allowing for great Indian ingenuity and effort to extend engine life, it is difficult to understand how India can overcome these problems much longer. The last two chiefs said they hoped a spare parts solution was near, but so far it has not arrived.[9]

A shortage of qualified pilots continues to be a problem that is the result of limited advanced jet training and reduced flying time, both caused by financial and aircraft difficulties. Also, the air force has not attracted as many pilot candidates as it had hoped, so the gap is not being closed.[10] It has been stated that the PAF has twice as many qualified pilots per squadron as the IAF.[11] One major reason for the shortage of qualified pilots may also be the limited number of suitable entrants in this all-volunteer force because of the unattractive terms and conditions of service for the bright and qualified youth

[8]The IAF claims it takes better care of its MiG-21s, and, through other means, has increased the length of engine life considerably.

[9]First reports on Prime Minister Rao's visit to Russia in early July 1994 suggest much-improved Indo-Russian relations. Yeltsin extended the terms of the 1992 line of credit for $830 million so that India can buy equipment in Russia to help solve the spare parts problem. Yeltsin and Rao also agreed that Russia has a central place in India's defense purchases and agreed to set up a $400 million workshop to overhaul Russian aircraft for India and the countries abroad. Mikoyan Design Bureau and HAL will cooperate in the venture. India may also buy more MiG-29s.

[10]See the CAG report, op. cit., pp. 12–13, which analyzes the IAF training system's failure for many years to provide the needed pilots.

[11]*India Today*, April 30, 1993, p. 77, and *Frontline*, October 23, 1992, stated that the IAF has half the pilots of the Pakistan Air Force.

of the country. A contributing factor in this problem may be the slow promotion offered in the armed forces, particularly in the air force, even in comparison with the navy and the army. Some of the Air Commodores (one-star equivalents), for example, are in their early-to-mid-50s. The continuing shortage of pilots, partricularly fighter pilots, must be solved, but the record for improvement has not been good, as the *Report of the Comptroller and Auditor General* explains in some detail.[12]

The important transport element is also experiencing difficulties because about 80 percent of transport aircraft and helicopters are of Soviet design. Reports indicate that two AN-32 squadrons have been deactivated and the aircraft cannibalized. Some MI-8/17 helicopters appear to have suffered a similar fate. Only a few AN-12s are now flying and will soon be retired. The IL-76s are in good shape (although they previously had experienced serious engine problems), but only 16 of these large transports are in the IAF. Therefore, while apparently the IAF's overall airlift requirement has not changed, airlift capabilities appear to be decreasing.

The IAF reportedly has one of the lowest aircraft utilization rates in the world.[13] This rate is due to a combination of factors: a shortage of pilots, modern trainers, and instructors, and constraints placed on flying time because of restrictions on fuel use and the inadequacy of maintenance. Furthermore, lack of modern weapons and sophisticated electronic equipment means the pilots probably are less qualified for modern warfare.

The IAF has been unable or unwilling to obtain force multipliers. The nation's integrated air defense is not completed. The development of an Indian Airborne Warning and Control System (AWACS) is languishing because of a lack of funds and a suitable airframe. In any case, it would prove a very expensive system for the IAF. Similarly, the IAF has an interest in aerial refueling, but the apparatus for refueling on the Jaguars has reportedly been removed. The IAF lacks some of the modern jammers and communications equipment that the PAF has obtained from the United States. Finally, the conflict in

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[12]CAG report, op. cit., pp. 8–18.

[13]Sanjeen Verma and A. Thothathari, "Special Report: The Indian Air Force into a Tailspin," *Business India*, September 13–26, 1993, p. 89.

the Gulf illustrated the crucial importance of advanced munitions, particularly precision weapons. Historically, the IAF has fought only short wars and has experienced problems in procuring sufficient weapons for them. The IAF has very limited quantities of advanced weapons. Given the surge in procurement of a number of new and different types of platforms in the 1980s, and the poor state of logistics spares, it seems likely that the IAF is in a poor position to acquire and stockpile sufficient numbers and types of modern munitions.

The budget crunch, the loss of the Soviet Union as a supplier of inexpensive aircraft, and the failure to plan ahead or perhaps to convince the government of its needs have led to immediate and overwhelming air force requirements. The IAF needs to replace an aging fighter fleet, is seriously short of spares, and desperately needs an advanced jet trainer. It is short of pilots, and training is suffering from a lack of training aircraft and restricted flying time. Also, little attention has been paid to procuring modern electronics and such force multipliers as aerial refueling, airborne early warning aircraft, and modern munitions, which the air force knows it needs.

## WHAT TO DO?

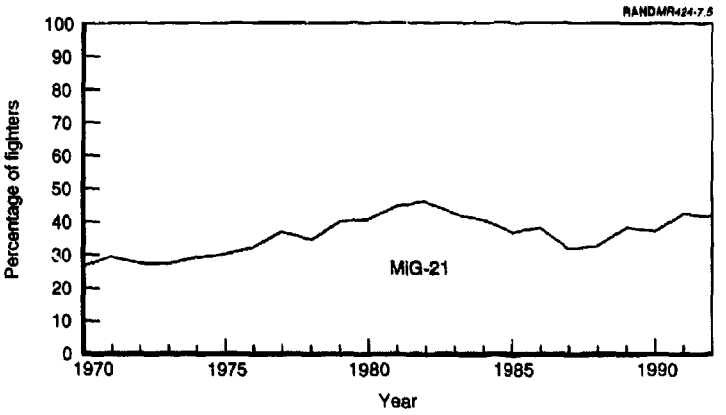
No one appears publicly to have a satisfactory solution to the very serious problems facing the IAF, and we are not privy to official discussions on these matters. Air Chief Marshal Kaul has reiterated the IAF's problems just as his predecessors have. He often cites the need for spare parts, the requirement for an AJT, and the necessity to upgrade the MiG-21bis. Always citing money as the issue, the government has tended to take no action on these problems. Air Chief Marshal Kaul has started a survey to determine how best to cut the fat in the IAF, but how much money such cuts will save is not clear. To give an idea of the problem, obtaining as many new AJTs as the IAF desires would probably cost $3 billion—more than the entire air force budget and about one-third the entire defense budget. Several retired IAF officers have written about the problems, although none seems to have a ready solution that matches the funds available.[14]

[14]For good examples of such descriptions, see C. V. Gole, "On the IAF's Diamond Jubilee . . . Whither the Indian Air Force?" *Vayu Aerospace Review*, V/1992, pp. 18–40.

The senior author held discussions in New Delhi on this subject, but without additional funds for the air force, no one believes much can be done.

One important factor the IAF may be overlooking is that because of its relationship with the former Soviet Union, it was able to obtain as many aircraft as it has because the Soviet Union provided good aircraft at inexpensive prices and low interest rates, as well as agreeing to licensing arrangements for local manufacture of aircraft and parts.

As seen in Figure 7.5, the MiG-21 has formed the backbone of the IAF for many years. Today, of the current IAF fighter force of roughly 700 aircraft, almost 300 (about 40 percent) are MiG-21s, most having served for 20 to 30 years. Thus, maintaining current IAF force levels would require either upgrading or replacing this critical fighter.




SOURCE: International Institute for Strategic Studies, *The Military Balance*, 1970–1993.

**Figure 7.5- -MiG-21 as a Percentage of Fighter Fleet**

and "The IAF Dilemma," *Vayu Aerospace Review*, VI/1992, pp. 2–6; and Jasjit Singh, "Affordable Defense of India," *Strategic Analysis*, February 1994, pp. 1379–1409.

Air Chief Marshal N. C. Suri, the recently retired Chief of the IAF's Air Staff, commented when Chief that the MiG-21 is still the mainstay of the IAF and that efforts would be made to make it last a little longer. Air Marshal (retired) M. S. D. Wollen has suggested that the upgrade of the MiG-21bis would be the most important project for the IAF in the immediate future.[15] The MiG-21bis upgrades could involve more than 100 MiG-21bis aircraft. The present Chief, Air Chief Marshal Kaul, also gives top priority to the MIG-21bis upgrade. A former Air Chief Marshal says the upgrade should provide "an excellent multi-role aircraft."[16]

Several firms have been competing vigorously for the MiG-21bis upgrade. The main contenders are HAL, India's indigenous aeronautical company; the Israeli contractor Elbit; and the Mikoyan Works of Russia. Others, including the United States, would like to participate. Recent reports suggest that Mikoyan has won the contract, although no price has been announced. The Russians have stated that they can upgrade the life of the airplane to 30 years and increase its combat potential five to six times. They plan to provide modern digital avionics and new-generation air-to-air and air-to-surface missiles. The Russians have used strong arguments to win the contract: They claim that they know the MiG-21 better than anyone else and are therefore best qualified to do the job; they have implied that they may not reveal the basic plans of the MiG-21 to other contractors, and—emphasizing Russian provision of spares and assistance with other aircraft—they have made it clear to the Indians that continued good relations between India and Russia depend on their winning the contract.[17] No official announcement of the contract award had been made by the Indian government as of early July 1994.[18]

On April 30, 1993, at a news conference in Bangalore, Air Chief Marshal Suri, then Air Chief, announced that the indigenous Light

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[15]Air Marshal (retired) M. S. D. Wollen, "MiG-21 BIS Upgrade," *Indian Aviation*, October 23, 1992, p. 4.

[16]*India Today*, January 31, 1993, p. 67.

[17]Mark Wagner, "Fighting over the Scraps," *Inflight*, May 11–18, 1994.

[18]A U.S. Embassy, New Delhi, source states that the IAF claims it has passed the project to MOD for the selection of a prime contractor. The same source says that because the IAF has not worked out specific subsystem components, it would be difficult for a contractor to make a bid.

Combat Aircraft will be test-flown in three years. The small (one-third the size of the F-22) LCA is a delta-wing, single-engine aircraft designed as a lightweight fighter and attack aircraft with a very small radar cross section. It will carry an 8000-pound bomb load, will have a refueling capability, and will operate on semiprepared airfields as well as from high-altitude runways. Continued progress on the LCA is hampered because three critical steps have yet to be taken: The needed engine must be developed, the software for the LCA's advanced flight control system must be created, and the various systems must be integrated into the aircraft. Proponents of the LCA claim that the problems surrounding these tasks will be solved. Because its schedule has already slipped many times, the LCA team is under great pressure to have the first flight in 1996. Some feel it will never be produced; others hope it will enter the IAF in 2006.

Modern fighter aircraft are needed *now*, but little or no mention has been made of obtaining foreign aircraft, which are very expensive, especially given the modern electronics and avionics they require.

The U.S. talk of releasing the F-16s it has been withholding from Pakistan has worried the Indian government, which states that it will buy 30 MiG-29s if the United States does so. This willingness to spend the amount of money this purchase requires demonstrates the Indian government's concern about the balance between the Indian and Pakistan air forces.

For some time, since before the F-16 crisis described above, India has been reported to be discussing a deal to receive a fourth squadron of MiG-29 aircraft from Russia.[19] The Indians and Russians also discussed joint production of the aircraft and agreed on a MiG-29 aircraft overhaul unit in India; Malaysia and Iran would be potential customers for the support facilities. Russia will demand hard currency for developing MiG-29 production facilities. Few outsiders know the details of discussions on the procurement of the MiG-29.

[19]Such reports appeared in the press frequently, but the government has made no announcement and funds are very tight. See, for example, *Armed Forces Journal*, May 1993, p. 16.

The Russians reportedly are working on several new versions of the MiG-29. The MiG-29C, with greater range and more sophisticated electronic equipment, has been flown and offered to the Malaysian Air Force. The MiG-29M, the latest version, has been offered to India as an LCA backup. It has multirole capabilities as well as some of the latest electronic and other equipment for its multirole functions. Allegedly these aircraft are being manufactured in Russia and are available at a price, but India, although it is interested, as of this writing apparently has made no decision on the MiG-29 because of financial limitations. Other reports suggest that no manufacturing of the MiG-29 is now going on in Russia.[20]

Several retired IAF officers have suggested that reducing the size of the air force may be the only option. A reduction should save operating and maintenance funds that could be used to update and upgrade the air force. Just for illustration, it might be possible to reduce to a combat force of 30 squadrons (down from 39) and to 7 transport squadrons (down from 10), although the army would have to be consulted on the latter reductions. Cutting the MiG-21 force by half and modernizing the MiG-21b.s for the short term would provide some breathing room. Over the longer term, savings realized through reduced operations and maintenance spending could be employed to procure more advanced aircraft. Helicopters and miscellaneous aircraft also would have to be cut some. In the process, some bases, infrastructures, overhead, etc., could be eliminated or reduced and could lead to perhaps a 15 percent savings for the total IAF budget.[21]

A rather long quote from retired Air Marshal Gole, who has kept up with the IAF since his retirement, sums up the problems and challenges of the IAF and indeed all the services:

> One thing is certain: the services will just have to agree to significant pruning and reductions. Ways and means will have to be devised of strengthening the clout and operational effectiveness of the smaller forces making them "lean but mean." There will have to be radical changes in doctrines and tactics. The thinking and planning will have to be done without bias, pet theories, prejudices and gran-

[20]"Military Aviation Changing Air Power Doctrines of Regional Military Powers" *Asian Defence Journal*, March 1993, pp. 45–50.

[21]Discussion of senior author with retired IAF officer in February 1994 in New Delhi.

> diose notions such as a blue-water navy, total mastery of the skies and two-front war-waging capabilities.
>
> Is India of today capable of taking such radical steps? At the beginning of this article a mention was made of the 1962 debacle. The conditions existing then show a remarkable similarity to those most likely to be obtained by the end of the century.
>
> We will spell them out:
>
> - Lack of central direction and long term strategy.
> - Outdated operational thinking.
> - Absence of deep knowledge and awareness of the adversaries' capabilities.
> - Obsolete/obsolescent weapons.
> - Paucity of funds.
> - Disinclination of the military bosses to face the politico-bureaucratic combine and to accept some bitter but necessary measures specially related to reductions in force levels.
>
> There is still a little time to remedy at least some of the above shortcomings. Some of these are in the hands of the Services themselves, which could be attended to at the earliest. If the Services fail to initiate such steps now, surely India will be faced with a 1962-type deja vu, only much worse this time since the stakes and war waging capabilities of the adversaries would be much higher.[22]

He sounds a note of hope and, at the same time, doubt, in view of the past record. The IAF has not made known, at least publicly, its position on force-size reduction, although it appears to oppose it. In fact, little is known about how it sees its problems and whether it has a general plan for addressing them. But hard decisions cannot be postponed much longer.

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[22] *Vayu Aerospace Review*, 1/1994, p. 43.

Chapter Eight

# CONCLUSIONS

The army remains the largest and most important of the three military services. It receives about two-thirds of the defense budget, is considered the main force in the defense of India against outside attack, plays an important role in internal security, and receives the greatest respect.

Support of the army is a top mission of the Indian Air Force. As we have seen, the IAF performed this mission well in the 1971 war but not in the 1965 war. The current air force leadership considers air support to the army as one of its highest priorities—a position the IAF has not always taken. However, the air force is not certain how well the army understands the use of air power in support of army operations. The army, for its part, is not entirely sure how much and how well the air force will support it. These interservice concerns are not unique to India.

The air force considers the air defense of India to be its most important mission. This vital and also independent role pleases the air force; in this role, it is not subordinated to the army. The air force has performed this function reasonably well, even though never fully tested by the PAF: Pakistan has never conducted a full-scale air offensive against India.

The transport mission of the air force, often forgotten, has been important for the IAF. It is the one role the IAF has played consistently in all of India's wars. Air transport was vital in the defense of Kashmir, especially Srinagar, in the 1947–1948 struggle. The IAF transport delivered supplies during the Chinese attack in 1962 while the fighter force was essentially grounded. It provided transport

support in the 1965 war. It was active again in the 1971 war as well as during the Sri Lankan operations supporting the IPKF. It performed admirably in moving paratroopers to the Maldives in 1988. The IL-76, which provides great lift, has a long range that can be used for power projection.

The reconnaissance capabilities of the air force, both tactical and strategic, are limited in number. Not much is known about these operations, particularly strategic operations, which are controlled by the top political leaders of India.

As well as having a variety of roles, India has had a great diversity of aircraft with which to perform those roles. A number of factors have contributed to that diversity in the IAF (and have resulted in a wide range of serious problems); the end result, however, is a poorly structured force. Either a clear and consistent plan for procurement has been lacking or the government has consistently ignored or overruled the air force leadership's recommendations. One Indian observer has written about IAF procurement in comparison with that of the PAF. The PAF "shows a careful and shrewd approach to planning, undoubtedly forced upon the PAF by the very limited resources that it deploys, and completely different from the ad hoc, almost cavalier manner in which India has gone about purchasing most of its aircraft."[1]

The procurement process and other factors have contributed to the diversity of aircraft in the IAF, a diversity that has resulted in a range of serious problems. Past reliance on the former Soviet Union is understandable: India now has a large air force because it procured many aircraft from the ex-USSR cheaper than it could replace them now on the open market. And Russia and India have recently entered into an agreement for upgrades and spare parts that makes India dependent on Russia.

The IAF is a large and professional force. But as reflected in its performance in internal budget battles and the wider political debate, it does not seem to have developed an air doctrine that articulates the importance of air power to the defense of India. Land thinking continues to dominate in spite of the demonstration of air power in the

[1] Pushpindar Singh et al., *Fiza'Ya*, op. cit., p. 79.

Gulf War. Nor has the IAF developed and publicized a concept for the greater employment of air power in the defense of India. Such a concept would appear to be a prerequisite for gaining a larger voice in the allocation of resources.

Overall, the army continues to dominate consideration of Indian defense matters. The war in the Gulf has not appeared to improve the IAF's political position in the Indian security community, nor has it spurred it to plan for a greater role for air power in India's defense.

## INDIAN ASSESSMENTS OF THE PROBLEM

Why this state of affairs? The following observations were made by Indian defense experts in the course of interviews conducted by the senior author. Others have been extracted from key documents reflecting aspects of India's internal debate.[2] It appears, from the CAG report cited earlier, that in at least two instances the top echelon of the IAF leadership has not acted as well as it should have: It failed to correct the shortage of pilots and the quality of training, and it delayed a long time to provide known requirements for repair facilities for the MiG-29, a serious shortcoming for the maintenance field. These two examples may not be indicative of overall leadership, but they certainly are shortcomings in two important areas: training and maintenance.

Although the extraordinarily tight budget conditions have not enabled the air force to take such desired actions as acquiring a new AJT and upgrading the MiG-21bis (India and Russia have reportedly reached an agreement for the upgrades), the air force has demonstrated little ability to plan for the future.[3] Former Air Chief LaFontain, when asked about avionics and advanced weapon systems, says they are badly needed and have been for some time. He goes on to say what seems to be the heart of the leadership problem: "We could have done very much better if we had introduced ad-

[2]It should be emphasized that the following observations were made by Indian defense specialists who agreed to be interviewed in connection with this study. The observations should not be construed as representing the views of the authors.

[3]David A. Fulghum, "India Seeks Aerospace Niche: Indian Air Force Faces Tough Choices," *Aviation Week and Space Technology*, July 25, 1994, has an up-to-date discussion of some of the IAF's problems and the LCA.

vanced ground level warfare devices such as the instrument range system. We did talk about the system, but then, as with everything, this was also given up."[4]

Why the air force leadership has behaved in such a manner is not obvious. In conversations in India, hints and forthright statements were made that the top echelon of IAF leadership needs someone outstanding like Air Chief Marshal Lal in the early 1970s. Some have suggested that, because the IAF follows strict seniority for promotions and seldom reaches down to promising young officers, leadership tends to be older and perhaps less decisive or innovative than younger, more energetic leaders might have been. Others argue that the top-level leadership has never gotten "out of the cockpit" and retains a pilot mentality rather than developing the quality of broad leadership that addresses the large problems, plans ahead, and provides strong overall leadership. A few argue that the fighter pilot is the top caste in the air force, and all Chiefs have been fighter pilots. Although they may be great pilots, they do not necessarily develop into the type of high-level leaders the air force requires. Some Indians have remarked that the air force leadership reflects the behavior of top-level leadership in the Indian government generally.

None of these explanations is entirely satisfying. Complaints about leadership in troubled times are no stranger to any organization. The CAG suggests procrastination at high levels of the IAF. And the budget, the civilian bureaucracy, and the "tyranny of the past" have played a powerful role in contributing to the IAF's problems. These factors, however, still do not explain why long-range planning seems to have been neglected or inadequate; why the need for an advanced trainer has become so desperate; why the IAF seems to have concentrated on the acquisition of aircraft and paid less attention to providing for modern electronics, force multipliers, and other less glamorous but vitally important needs of the air force; and why the air force has been so poorly represented in internal political struggles with its sister services.[5]

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[4]Sanjeen Verma and A. Thothathari, "Special Report: Indian Air Force into a Tailspin," *Business India*, September 13–26, 1993, p. 92.

[5]See Pushpindar Singh et al., *Fiza'Ya*, op. cit., pp. 184–185, for interesting views on the intangibles of the IAF and the PAF.

Retired air force officers particularly, but others also, have spoken of poor living conditions for air force personnel, especially pilots. One asked how India could expect a pilot for the most sophisticated modern jet to perform effectively after a night with no air conditioning and plenty of bugs. A contributing factor to the accident rate in the IAF is the presence of birds around airfields. In many cases, slaughterhouses near the air bases attract flocks of large birds, and the government appears to have had difficulty getting the slaughterhouses moved. Such conditions are not conducive to attracting the best and the brightest that the Indian Air Force would like to recruit as pilots and technicians. Pilots, especially transport pilots, and technicians can find better-paying jobs and better living conditions in the commercial world. A shortage of pilots suggests that such conditions continue to be an important problem.

In spite of the current budget problems and political difficulties, India has not given up its desire for military forces that it deems appropriate for its security and for a nation of its size and importance. Increasingly, public concerns have surfaced over the present state of India's military forces and the government's ability to develop defense policies and strategies. Some change in the defense planning machinery appears to be in the air. Economic reforms appear to be improving the economy—and may facilitate modest increases in the defense budget. Without changes in IAF policy, leadership and accepted roles of the air force, and visibility, however, the future is more likely to resemble the past.

Appendix

# INDIAN AIR FORCE COMMAND STRUCTURE

India has the second largest regional air force in Asia, next to China's. India's current command structure dates from its conflict with China in 1962. Originally, the command structure was organized functionally, but because of the size of the country and the fact that India faced threats from different directions, the IAF decided to reorganize its operational command structure by regions. To maintain uniform standards in training and maintenance, however, it retained two functional commands that controlled these activities throughout the country. The Indian Air Force now has five operational air commands, each under an Air-Officer-Commander in Chief (AOCinC).

**Western Air Command**, headquartered in Delhi, is the most important and sensitive of the five regional commands. It controls air operations north of Jaipur, including the capital and the Punjab, and from Kashmir south to Rajasthan. An Air Operations Group, formed in 1982 at Udhampur, is dedicated to the defense of Jammu and Kashmir, including Ladakh. A forward headquarters is located near the Western Army Command at Chandigarh. The Western Air Command has several permanent airfields, including Adampur, Ambala, Awantipur, Chandigarh, Halwara, Hindan, Leh, Srinagar, and Pathankot; as well as forward-based support units (FBSUs), including Amritsar, Bathinda, Sirsa, and Udhampur. These bases have a total of nine MiG-21 fighter squadrons, as well as one MiG-29 and one MiG-23MF squadron operating in the air defense role. Typically, six

dedicated ground attack units are also present, equipped with the Jaguar, MiG-27M, and MiG-23BN aircraft.[1]

**South-Western Air Command**, headquartered at Jodhpur, was established in 1980. Previously, its command area was under the operational control of the Western Air Command. It controls air operations in most of Rajasthan, and south through Gujarat to Saurashtra, and Kutch to Pune. Because it has no sensitive adjacent areas, its task has been largely air defense; however, it is now reported to have a strike mission, through Pakistan's "soft underbelly."[2] This command has two MiG-29 and at least five MiG-21 units, as well as two MiG-23BN fighter-bomber units and one maritime strike squadron equipped with Canberras and Jaguars. Permanent airfields are located at Bhuj, Jaisalmer, Jamnagar, Jodhpur, Nalia, Barmer, and Pune; and FBSUs are located at Ahmedabad, Nal, Suratgarh and Uttarlai.[3]

**Central Air Command** (CAC), headquartered at Allahabad, includes most of the Indo-Gangetic plain, extending east of Delhi almost as far as Bengal, and almost all of Central India. This command was reduced in size with the establishment of the Southern Air Command. CAC controls most of IAF's transport units, even when they are based in the area of responsibility of other commands. Most transport aircraft are Soviet types. The AN-32 in six squadrons (100 aircraft) is the workhorse of the fleet. Two squadrons of Il-76s provide long-range heavy lift, while 30 DO 228s are utility aircraft. MI-8/17 transport and MI-26 heavy-lift helicopters also provide airlift capabilities. Two Mirage 2000 squadrons and one MiG-21 unit provide air defense. Permanent airfields are located at Agra, Bareilly, Gorakhpur, Allahabad, Nagpur, Kanpur, Gwalior, and Bakshi-ka-Talab.

**Eastern Air Command**, with headquarters at Shillong, is in charge of the air defense of Calcutta and is responsible for Bengal, Mizoram, and the other states bordering on Tibet, Bangladesh, and Burma.

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[1]Pushpindar Singh, "The Indian Air Force: Modern and Professional," *Asian Defence Journal*, September 1987, p. 10, and "Indian Air Power," *Frontline*, September 28, 1991, p. 145.

[2]Discussion, September 1993, with a retired Air Marshal in New Delhi.

[3]"Indian Air Power," *World Airpower Journal*, London: Aerospace Publishing Ltd., 1993.

The main focus of this command is anti-insurgency operations and includes one air defense unit with MiG-21s, two or three ground attack squadrons with MiG-27s, and one with Hawker Hunters. Permanent airfields are located at Kalaikunda, Barrackpore, Bagdogra, and Hashimara in Bengal and at Gauhati, Tezpur, Jorhat, and Chabua in Assam.

**Southern Air Command**, formed in July 1984, is responsible for the most territory. Its area includes the southern regions of India, the Bay of Bengal, and the Laccadives, as well as the Andaman and Nicobar Islands near Sumatra, and Lakshwadeep. Its headquarters is located at Trivandrum. This command has no combat units of its own, although its FBSU at Madurai could receive fighters in an emergency. Other airfields house training and support units.

In addition, the IAF has two support commands.

**Training Command** is headquartered in Bangalore. Most of its flying and ground training establishments are located in Central and Southern India.

**Maintenance Command** operates out of Nagpur in Central India and handles the repair, overhaul, and maintenance of aircraft and other equipment.

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